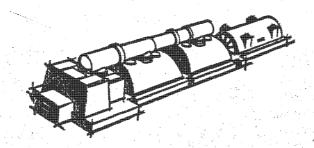
IPP Unit # 2
TURB PERF TESTS
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# PERFORMANCE TEST REPORT

# INTERMOUNTAIN POWER PROJECT UNIT NO. 2

TURBINE NO. 270T151 820000 KW TC6F-30 3600 RPM 2400 PSIG 1000/1000F

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PERFORMANCE TEST REPORT INTERMOUNTAIN POWER PROJECT UNIT NO.2

BY

P.G. ALBERT

Tb.No.270T151 TC6F-30"LSB

2400 psig, 1000/1000F, 1.66/2.24/2.99"Hg ABS

DF87STG05

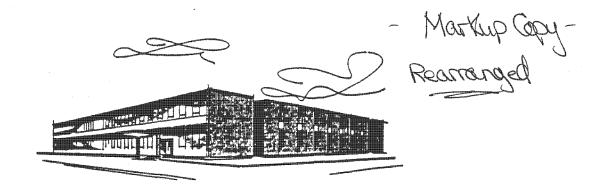
Class III

February 26,1988

820,000 KW PER MGW

3600 RPM

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# Turbine Technology Department

SCHENECTADY, NEW YORK

PERFORMANCE TEST REPORT INTERMOUNTAIN POWER PROJECT UNIT NO.2

BY

Paul

P.G. ALBERT

Tb.No.270T151 TC6F-30"LSB 2400 psig,1000/1000F,1.66/2.24/2.99"Hg ABS 820,000 KW 3600 RPM

DF87STG05

Class III

February 26,1988



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#### Contents of Report

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#### L INTRODUCTION

A full scale ASME performance test was run on the IPP #2 unit to determine the overall performance of the turbine relative to its guarantee. The tests were conducted through the cooperative efforts of General Electric Company and Intermountain Power Project.

Dotes?

The turbine-generator unit was intially synchronized in February 1987. Enthalpy drop efficiency tests were run on the high pressure (HP) and intermediate pressure (IP) turbines after startup to establish the efficiency levels for these components. The establishment of the startup performance level as soon as possible after initial synchronization is a necessary prerequisite to the running of an ASME full-scale acceptance test. This step provides the basis for identifying the presence of performance deviations which may occur in the time period before a full-scale test can be run.

In May of 1987, the full-scale ASME performance test was conducted. The initial test point was performed for the primary purpose of instrument checkout, data taker training, isolation verification, and determining the efficiency of the HP and IP turbine sections. This data showed the HP turbine efficiency to have deteriorated 1.4% since startup and the IP turbine efficiency to have deteriorated 0.2%. Despite this deterioration, the performance test was conducted as originally planned. A series of nine full-scale ASME test points were then conducted from May 11 through May 16, 1987. This report presents the results of the full-scale performance test as well as the startup enthalpy drop test.

#### IL INSTRUMENTATION

The instrumentation and measurements required for a full scale test are described in detail in PTC-6 1976. A brief summary of the application of PTC-6 to the IPP #2 unit follows:

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#### A. Description of Unit

The turbine is a tandem compound 3600 RPM design with a single flow HP turbine, a double flow IP turbine, and a six flow low pressure turbine with 30" last stage buckets. It is a single reheat design with rated steam conditions of 2400 psig/1000F/1000F and a nameplate rating of 820,000 KW at 1.66/2.24/2.99" HgA exhaust pressure. A cross-section of the HP turbine is given in Figure 1A, the IP turbine is shown in Figure 1B, and one of the three low pressure sections is shown in Figure 1C.

A schematic of the the turbine and feedwater cycle is given in Figure 2. The locations and types of measurements which were made are identified on this figure.

#### B. Pressures, Temperatures, Flows

Most of the instrumentation for the test was provided by the General Electric Company. Temperatures were measured using calibrated chromel constantan thermocouples with continuous leads from the hot junction to an electronic (real ice) ice bath. Per PTC-6 recommendations, temperatures which have the most influence on the test results were measured at two different points, close together, and the mean of the readings was considered to be the temperature of the fluid.

Transducers were used for the measuring the various pressures as well as the differential pressures across numerous flow elements. Many pressures were multiplexed to one transducer through the use of scanivalves. This justified the use of expensive, ultra high accuracy Ruska quartz bourdon tube transducers. Rosemount and Gemac transducers were used to measure differential pressures on secondary flow elements and

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Heise pressure transducers were used for some static pressure measurements. Prior to the start of the test, an in-place calibration of transducers was performed.

The condensate flow to the deaerator was measured using an ASME primary-flow section which had a throat tap nozzle with a Beta ratio of 0.423 and a throat diameter of 9.842". Calibration of this flow section was completed by Alden Research Laboratory (ARL Report No. 112-84/C354) and the results are show in Figure 3. This flow section, which is the property of IPP, was inspected by IPP personnel a number of weeks prior to the test and found to be clean and undamaged. After completion of the test, GE recommended that the nozzle be inspected to verify that the nozzle remained clean during the test. However, the outage schedule never permitted inspection of this nozzle soon after the test. The differential pressure across the nozzle was measured on both sets of taps with Ruska DDR transducers. The temperature-controlled quartz bourdon tube transducers have an accuracy of 0.02% of reading plus 0.02% of full scale.

A calibrated flow section having a throat tap nozzle with a Beta ratio of 0.45 was used to measure the extraction steam flow to each of the two boiler feed pump turbines. The main steam attemperation spray flow was measured with a station pipe tap nozzle which was inspected by IPP prior to the test using the inspection port. A station orifice was used to measure the combustion gas reheat return to the deaerator. The feedpump injection flows where measured with six station orifices, one for each of the two main boiler feedpumps, one for the startup boiler feedpump, and one for each of the three booster boiler feedpumps. The feedpump seal return flows were measured with two calibrated turbine-meter flow sections which were provided by GE. Numerous flows in the steam seal system (see Figure 4) were measured with station orifices and forward-reverse tubes. No reheat attemperation spray flow or air preheat flow was used during the test.

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#### C. Electrical Measurement

The generator electric load measurements were obtained using the following apparatus:

Electrical Apparatus Used	Serial No.	Phase
Current Transformers (customer's property)		
Potential Transformers (GE Property) Type: JVS-150 Rating: 13800/120, 3000 VA, 60 Hz	G425553 G414871 K135196	A B C
Instruments (GE Property) Precision Watthour Meters Type: IBL-10 (Modified) Rating: 2.5 Amp, 120 Volt, 60 Hz	30809740 30809742 30809743	A B C

The precision watthour meters and the associated readout equipment were used to determine generator output of each of the three phases. These instruments were supplied by the General Electric Company along with a test cabinet for making all necessary electrical connections. The measuring setup was located in the control room.

The precision watthour meters were calibrated in Schenectady at the standards laboratory of Upstate New York Instrumentation Services, General Electric Company. During the calibration and the test, these meters operated in a temperature-controlled cabinet.

The potential transformers were calibrated at the General Electric Somersworth, New Hampshire plant. These calibrations provided the phase angle correction factors and the ratio correction factors for the potential transformers. The secondary burden consisted solely of our instruments. All transformers were grounded at their secondaries. During the testing, steam conditions and throttle flow were held as steady as possible to maintain steady generator load.

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During each test, revolutions of the IBL-10 watthour meters were counted by electronic counters. The digital readout of these counters and the timer was photographed or recorded at precise 15-minute intervals. Phase voltages and currents were recorded by the data acquisition system. These values were used to determine the average armature current of each phase, average line-to-line voltage, and the power factor of the unit during each test. The value of generator hydrogen pressure was recorded during each test using the station instrumentation.

#### D. Data Acquisition

During the ASME performance test, a Hewlett-Packard 1000 data acquisition system was used for collection and reduction of test data. The computer has a 0.5 megabyte core memory with a 64 megabyte disc and is housed in a mobile trailer. For convenience, the mobile trailer was located on the turbine deck for the duration of the test.

Use of the system eliminated the need for about 20 data takers, thereby reducing the testing cost for the customer. In addition, the rate of recording data was increased and thus reducing data scatter uncertainty. Using both pressure multiplexing and computer input multiplexing, the scan time was about 3.7 minutes. The more important variables such as primary flow were read more frequently (once every 28 seconds).

During a test point, the system allowed complete visibility of the data as it was logged and stored on magnetic tape. Upon completion of a test point, a hard copy of the raw data was printed, along with corresponding scan times and averaged values converted to engineering units. The system could also be used to perform heat balance calculations for determining detailed turbine performance results as well as information on the performance of other components of the cycle.

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#### E. Cycle Isolation

For all test points, a number of valves were closed to prevent unaccounted-for flows from entering or leaving the test cycle or bypassing any cycle component. Many lines were isolated by closing two isolation valves and opening a drain between the valves to verify no leakage. For steam line drains to the condenser, the drain line temperature near the condenser was checked to verify that the single isolation valve was not leaking. During the initial test, some drain valves were found to be leaking, but these isolation problems were corrected by closing additional drain line valves.

The No. 1 and No. 2 low pressure heater continuous vents were not isolated to avoid the heater from becoming air bound during a test point. These heater vent leakage flows were estimated to be insignificant to overall performance and no correction was made in the heat balance calculations for this performance loss.

The unaccounted-for flow leaving the cycle was about 0.1% of the valve wide open throttle flow. Some identified sources for this leakage were the deaerator drain and two relief valves from the final feedwater line.

#### III. CALCULATIONS

Ten test points were run during the period May 9 through May 16, 1987 which covered three valve best point operating conditions: second, third, fourth, or VWO condition. Test point 1 was considered a preliminary test whose main objective was to provide a check on the cycle isolation and instrumentation. Several isolation deficiencies and instrumentation problems were discovered and corrected. Test points 2, 4, 5, 6, 7, 8, and 10 were run with the cycle in the design mode of operation. Test points 3 and 9 were run with the total flow from the heater #2 drain going to the condenser. Test point 8 was run at VWO over

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pressure. A sum mary of test conditions for these test points is given in Figure 5.

The test data which was recorded and stored on a magnetic tape during each test point was printed, along with averaged values converted to engineering units and corrected for water legs, barometric pressure, and instrumentation calibration. The data was then posted on a copy of the instrument diagram (Figure 2) and reviewed for errors, inconsistencies, completeness, etc. An example of a completed posting diagram developed for test point 6 is shown in Figure 6.

The electrical load was calculated from the data obtained from the measurements described in Section II-C by the formula:

Load = Rev. x 60 min./test time (min.) x K x WHMCF x CTRCF x PTRCF x CTMR x PTMR

where:

K = Watthour Meter Constant

WHMCF = Watthour Meter Correction Factor

CTRCF = Current Transformer Ratio Correction Factor

PTRCF = Potential Transformer Ratio Correction Factor

CTMR = Current Transformer Marked Ratio

PTMR = Potential Transformer Marked Ratio

These calculations are done for each phase and the sum of them is the total generator load. Generator data for the average armature current of the phases, the average line-to-line voltage, and the hydrogen pressure are listed in Table I. The test generator load and power factor (PF) are listed in Table II. Comparisons were made between the electrical measurements made by General Electric and the readings obtained from the station computer. These results, given in Table III, show computer point TGBPKO to read within 0.1% of the test electrical load equipment and computer point COAXIO read about 0.25% less MW output. The generator losses are shown in Figure 7.

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#### Table I Generator Data

Test No.	Avg. Armature Current of 3 Phases	Avg. Line-To-Line Voltage	H2 Pressure Psig
2	19429	25772	64
3	13410	25736	58
4	19505	25743	64
5	17960	25644	61
6	19554	25699	64
7	17428	25634	62
8	20213	25608	63
9	13614	25532	63
10	17818	25618	63

#### Table II Generator Load

Test No.	Date	Time	KW	PF
2	5/11/87	14:15 - 16:15	855960	0.987
3	5/13/87	04:30 - 06:30	592031	0.991
4	5/13/87	01:45 - 13:30	859850	0.989
5	5/14/87	03:30 - 05:30	785980	1.000
6	5/14/87	08:30 - 10:30	860755	0.989
7	5/15/87	03:15 - 05:15	775096	1.002
8	5/15/87	08:30 - 10:30	898356	1.002
9	5/16/87	04:15 - 06:15	599736	0.996
10	5/16/87	13:30 - 15:30	789272	0.998

#### Table III

	GE Measured	Station Computer (MW)		Station Computer (MW)	
Test No.	(MW)	TGBPKO	% Diff.	COAXIO	%Diff_
2	855.960	855.17	-0.09%	853.85	- 0.25%
3	592.031	592.19	0.03%	590.85	-0.20%
4	859.850	859.82	0.00%	857.92	-0.22%
5	785.980	785.66	-0.04%	783.30	-0.34%
6	860.755	860.67	-0.01%	858.63	-0.25%
7	775.096	774.50	-0.08%	777.20	0.27%
8	898.356	<b>1000</b>	and application	Made COURS	-
9	599.740	599.12	-0.10%	598.31	-0.24%
10	789.270	787.51	0.03%	786.57	-0.34%

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The performance of the test cycle was calculated by supplying the measurements identified on the posting diagram for each test point to a computerized heat balance model of the turbine cycle. A sample calculation can be found in the ASME PTC-6 Appendix A to Test Code for Steam Turbines. All calculations have been performed using ASME steam properities. The computer output for the test cycle calculations is contained in Appendix A. The output for each test point contains detailed turbine performance results as well as information on the heaters, pumps, and other components of the cycle. The information contained in Appendix A for test point 6 is summarized on the test cycle heat balance diagram of Figure 8.

The expansion line end point (ELEP) was calculated by subtracting the appropriate exhaust loss obtained from the curve given in Figure 8A from the measured used energy end point (UEEP). It is noted that the exhaust loss curve shown in Figure 8A is based on data obtained from numerous tests which were conducted on similar turbines with 30" last stage buckets and also from data obtained on laboratory models.

With the test performance characteristics of the turbine established, the contract cycle analysis was then conducted. The contract cycle analysis provides the final results which are used to compare the test performance with the guarantee performance of the turbine. Contract cycle analysis restores the performance of all the cycle components except the turbine to their respective design values while maintaining the test performance characteristics of the turbine. The test characteristics for the turbine and the steam conditions taken from test cycle are:

- 1. High pressure turbine efficiency
- 2. Reheat turbine efficiency (UEEP)
- 3. Packing flows and rotor cooling steam flow
- 4. Stage flow functions
- 5. Hot extractions \*
- 6. Throttle flow
- 7. Throttle pressure
- 8. Throttle temperature
- 9. Reheat temperature
- 10. Exhaust pressure

<sup>\*</sup> Hot extractions refer to the difference between the test extraction enthalpy and the corresponding stage test expansion line enthalpy.

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The exhaust loss given by Figure 8A was used in the contract cycle analysis calculations to relate the UEEP and ELEP enthalpies. A method of performing contract cycle calculations is shown in the ASME PTC-6 Appendix A to Test Code for Steam Turbines.

Contract cycle calculations were performed on eight test points which covered the three valve best point operating conditions: second, third, fourth, or VWO conditions. The flows, pressures, enthalpies, output, and heat rate obtained in the contract cycle analysis are shown on the heat balance diagrams of Figures 9A-9H for test points 2,3,4,5,6,7,9, and 10, respectively. Note that the turbine auxiliary power requirements of 175 KW's have been accounted for by including them in the fixed losses. The test cycle fixed losses were 4353 KW and the contract cycle fixed losses were 4528 KW. The correction of output and heat rate to design steam conditions is discussed in Section IV-4.

#### IV. RESULTS

A summary of pertinent results from both the test cycle and the contract cycle analysis follows:

#### 1. HP Turbine Efficiency

The efficiency of the HP turbine was measured \* during each test point. The results are plotted on Figure 10 as a function of throttle flow ratio (TFR) which is the ratio of the throttle flow to the valves wide open (VWO) throttle flow. The efficiencies and the TFR have been corrected to rated throttle conditions of 2400 psig/1000F. The efficiencies obtained from the design heat balances are included. For the VWO points (test points 2,4,6, and 8) the test efficiency is 2.0 % better than the design VWO heat balance. This is worth an estimated 0.3 % in turbine heat rate.

\* Appendix D describes the measurement and calculation of HP and IP efficiency.

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The efficiency of the HP turbine deteriorated since the initial performance was established at startup. This is shown in Figure 11, which includes the results of the data taken during the enthalpy drop tests and the full-scale tests. The efficiency established at startup was 1.4% better than the full-scale test. This loss of HP efficiency is worth about 0.25% in turbine heat rate. The ratio of the first stage pressure to throttle pressure for a given valve point has also decreased from the initial test obtained at This could indicate a decrease in flow capacity due to a restriction in the first stage or valves, or an increase in leakage flow from the first stage such as cooling steam flow and N2 packing flows.

#### 2. IP Turbine Efficiency

The efficiency of the IP turbine was also measured during each test point. This efficiency is defined from ahead of the combined reheat valves to the LP bowl. The results obtained during the full-scale test are plotted in Figure 12, along with those previously obtained from the enthalpy drop test. The IP turbine efficiency showed about 0.2% deterioration from what was established at startup.

#### Reheat Turbine Efficiency IP-LP Combined 3.

The reheat turbine efficiency reflects the combined performance of the IP and low pressure sections. It is measured from the initial conditions . defined by the pressure just ahead of the Combined Intercept Valves (CIV's) and bowl enthalpy to the endpoint conditions defined at the exit of the low pressure turbine. Unlike the HP and IP efficiencies discussed above, reheat efficiency can only be determined by performing a full-scale test since a heat balance around the entire turbine in required to determine the used energy endpoint (UEEP) at the low pressure turbine exhaust. Hence, no data for the reheat efficiency was available from the previous enthalpy drop tests which were run prior to the full-scale test.

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The results of the reheat turbine UEEP efficiency are presented in Figure 13. These results have been corrected to 1000F reheat temperature. The level of efficiency indicated by the test curve is equal to the design curve.

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Results for the reheat turbine efficiency based on the expansion line endpoint (ELEP) are shown in Figure 14. The annulus velocity used to calculate and plot the ELEP efficiency was based on the three exhaust pressures obtained in each of the three hoods rather than the combined average exhaust pressure for all three hoods. For each test point, the exhaust loss was determined for each of the three hoods and the average exhaust loss was then used to calculate the ELEP efficiency. The test level of performance is better than the design level of performance.

#### 4. Output and Heat Rate

#### A. Test Cycle

The test value of the major variables which affect turbine and cycle performance are shown in Appendix C along with the test cycle results for output and heat rate. This data has been used in conjunction with the correction curves for throttle pressures, throttle temperature, reheat temperature and exhaust pressure, which are given in Appendix B, to obtain values for the test output and heat rate corresponding to the rated conditions of 2400 psig, 1000/1000F, 1.66/2.24/2.99 HgA, 0.9 power factor, and H<sub>2</sub> pressure of 63 psig. The final values for test output and heat rate at rated conditions have been plotted in the form of test heat rate versus test load in Figure 15. The design curve shown is based on the design heat balances which include 1% cycle makeup and a heat rate definition with heat input by the condensate pump and for 0.1% boiler blowdown flow.

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#### B. Contract Cycle

As noted earlier in Section III, the results of the contract cycle analysis provided the test turbine performance with all other components in the cycle performing at their respective design performance levels. The contract cycle analysis provides the results for turbine output and heat rate which are used to compare the test performance with guarantee. Table IV contains a summary of the contract cycle results for output and heat rate. Both have been corrected to rated conditions using the same correction factors listed in Appendix C. The corrected data is plotted in Figure 16 which also contains the design heat rate curve.

The contract cycle test heat rate was compared to the quarantee value using the method outlined in the turbine-generator contract. First, the equation for the straight line between the design heat balance heat rates at the third valve point and valves wide open was determined. Second, the difference between the heat rate at 820,000 KW from the straight line equation and the specified contract 820,000 KW guaranteed heat rate was calculated to be 6.9BTU/KW-HR. Third, the test heat rate at 820,000 KW was calculated from a straight line equation between the test heat rates at the third valve point and the valves wide open. The resultant corrected test heat rate at 820,000 KW was then determined by subtracting the 6.9 BTU/KW-HR obtained in step 2 from the straight line interpolation of the test heat rate obtained in step 3. corrected test heat rate is 7793.0 BTU/KW-HR and guarantee value is 7816 BTU/KW-HR (See the guarantee heat balance 481HB111 The test value is better than guarantee by shown in Figure 17A). 23.0 BTU/KW-HR or 0.3%. The test heat rate is considerably better than the design level over the entire tested load range. difference is primarily attributed to the better stage performance of all turbine sections relative to design.

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Using the startup levels of HP and IP efficiency, the corrected contract cycle heat rates would have been 0.55% better than guarantee.

The VWO test output of 872781 KW (Average of test points 2,4, and 6) exceeds the guarantee value of 820,000 KW by 6.4% and design VWO value by 2.5%. The measured VWO throttle flow corrected to 2400 psig/1000F is 6,271,150 LB/HR (average of test points 2,4, and 6) which exceeds the design VWO throttle of 6,122,730 LB/HR by 2.4%.

<u>Table IV</u>

<u>Summary - Contract Cycle Analysis</u>

<u>Generator Output</u>

Test ASS X	Contract Cycle * Output	Contract Cycle Output** Corrected to Rated Conditions
2	843805 KW	374951 KW
3	586602 KW	602734 KW
4	847509 KW	872168 KW
5	775180 KW	795887 KW
6	848153 KW	371223 KW
7	763183 KW	788467 KW
9	593082 KW	594212 KW
10	777947 KW	794286 KW

#### Heat Rate

Test Yes	Contract Cycle * Heat Rate	Contract Cycle Heat Rate** Corrected to Rated Conditions
2	7958.9	7767.2
3	8084.6	7916.5
4	7984.9	7791.4
5	7977.7	7812.4
6	7951.3	7777.4
7	7996.9	7811.6
9	7872.3	7928.7
10	7897.2	7808.4

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Contract tikes \* corrected for PF, H2, MU

Calculated for the test conditions of throttle pressure and temperature, reheat temperature, and exhaust pressure. The power factor and hydrogen pressure were 0.90 and 63 psig, respectively. Makeup of 1.0%.

The corrections used for throttle pressure, throttle temperature, reheat plus rated conditions temperature, and exhaust pressure are listed in Appendix C.

(Corrected for Motor TEP, HRHT, APRH, BP)

#### 5. Stage Flow Functions

The flow function for a stage is defined by the relationship:

Stage Flow Function =  $O/(A\sqrt{P/v})$ 

where:

Q = Flow to the following areas

A = Stage nozzle area

P = Stage shell pressure

v = Specific volume at the stage shell pressure and te mperature

The flow function should have a constant value which is usually independent of load. Plots of this function will reflect any errors that may exist in the measurement of flow, pressure, or temperature at a specified point in the cycle. Its consistency is a measure of the precision of the test.

Plots of the flow functions calculated for those locations in the turbine where pressures and temperatures were measured (see Figure 2) are given in Figures 19-28. Generally, the values from each test point line up very well for each respective location demonstrating good consistency and, therefore, good precision.

The flow functions obtained for the positions in the HP turbine (Figures 19 and 20) exhibit a positive slope with flow to the following stage (i.e., load). This relationship is common to other large singleflow fossil, high pressure turbines. The remaining plots contain the

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## TECHNICAL INFORMATION SERIES NO. DF87STG05

results for locations in the IP and LP turbines. The first stage pressure has been plotted versus throttle flow in Figure 18.

#### 6. Packing Flows

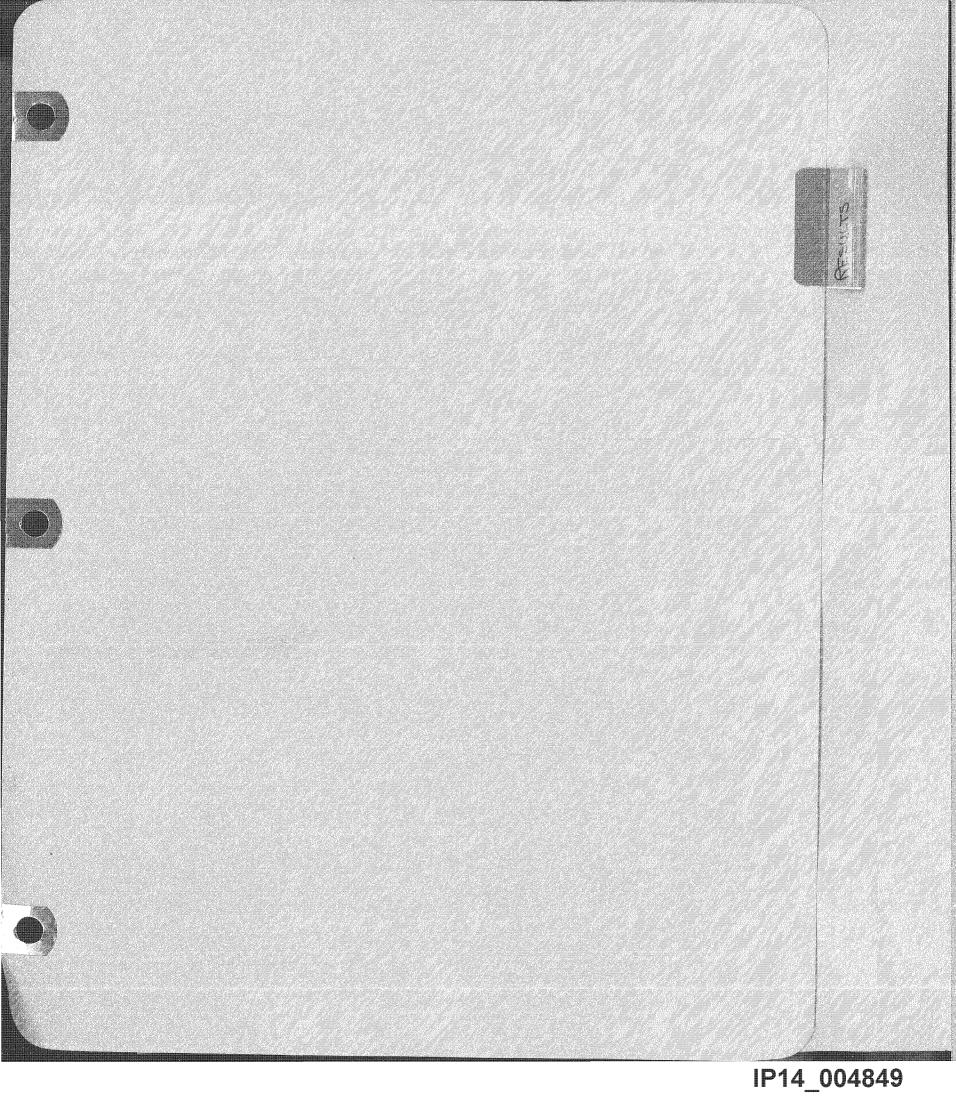
The turbine shaft packing flows were measured (see Figure 2) during the ASME performance test. The more significant flows are plotted in Figures 29-34. The HP turbine high pressure packing flows are plotted versus throttle flow in Figures 29 and 30 while the low pressure packing leakoff flows are shown in Figures 31 and 32. The IP turbine shaft packing flows to the steam seal header are shown in Figures 33 and 34.

The packing flow constants determined from these test results have been used in the contract cycle calculation. However, packing flows have only a small effect on heat rate.

#### V. CONCLUSION

The IPP #2 turbine-generator unit is 23.0 BTU/KW-HR or 0.3% better than guarantee at the guarantee output of 820,000 KW. The performance level of the unit is considerably better than design over the entire load range. The maximum contract cycle KW output at rated conditions is 872,781 KW. This exceeds the design VWO value of 851,733 KW by 2.5%. The maximum test throttle flow at rated steam conditions is 6,271,150 lb/hr., which is greater than the valves wide open (VWO) throttle flow of 6,122,730 lb/hr by 2.4%. The HP turbine section efficiency is 2.0% better than design at VWO, while at startup, it was 3.4% better than design. The reheat turbine efficiency, which reflects the combined performance of the IP and low pressure turbine sections, is on the average 0.2% better than design when corrected to rated reheat temperature.

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## GENERAL ELECTRIC

# TECHNICAL INFORMATION SERIES Title Page

CARACTER STATE OF THE STATE OF		
AUTHOR	Fill Scale ASME	
P.G. Albert	Performance Test	DATE 3/3/88
TITLE	G.E. CLASSIII	
	ower Project Unit #2, 270T151 OP/1000F/1000F, 2.3" HgA	GOVT.CLASSONE
REPRODUCIBLE COPY FILED AT Technical Report Library Building 273, Room 315, Schenectady, NY NO. PAGES		
SUMMARY		
This report pre ASME performance results show the	sents the results obtained from e test conducted on the IPP uni at:	a full scale t #2. The
820,000 KW,: 1.66/2.24/2.9 7793.0 BTU/K	test heat rate at the guarantee rated conditions of 2400 psig/199" Hg, and the contract cycle W-HR, which is 0.3% better than the performance is consistent ov	000F/1000F, conditions is guarantee.

The maximum contract cycle generator output corrected to rated conditions is 872,781 KW, which exceeds the valves wide open output by 2.5%.

range.

The maximum test throttle flow at rated throttle steam conditions is 6,271,150 lb./hr., which is greater than the valves wide open throttle flow by 2.4%.

ASME test, full scale test, performance test, efficiency, Intermountain Power Project, IPP #2.

INFORMATION PRE	PARED FOR Steam Turbine-Generator Engrg. & Manufacturing Operations
TESTS MADE BY _	Intermountain Power Project and General Electric Company
AUTHOR	P.G. Albert Paul 3/9/88
COMPONENT	Performance Engineering
APPROVED	John A. Booth, Manager - Performance Engineering Tokal Front Stokes
AUTHORIZATION, AND DISTRIBUTION	CLASS
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# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

#### APPENDIX C

#### Correction To Heat Rate and Load

Test Heat Rate and Load Corrected to Re	tea Conditions C
Contract Cycle Heat Rate and Load Corr	ected to Rated Conditions C

#### Notes:

Page C2 shows the measured values of heat rate and load corrected for group 2 corrections. These corrections include power factor,  $\rm H_2$  pressure, throttle pressure, throttle temperature, reheat temperature and exhaust pressure. No correction for off-design cycle conditions are included in the corrected test heat rate and load.

Page C3 shows the contract cycle heat rates and loads which represent the measured heat rate corrected to the specified cycle on the guarantee heat balance (i.e., group 1 corrections). The corrected contract cycle heat rates and loads have also been corrected for group 2 corrections and these are the final values of heat rate and load to compare to the guarantee values.

Page No. C1
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Maintain one-inch side margins.

Test Summary Conditions

## TEST HEAT RATE AND LOAD

TEST POINT	2	· · · · · · · · · · · · · · · · · · ·	4	5	6	"	8	9	10
BUMMARY OF TEST CONDI	TIONS:								
MEAS D LOAD	855960	592031	859850	785980	860755	775096	898356	599736	789272
THROTTLE FLOW	6183909	4056100	6220163	5570279		5477861	5496919	3978528	5527099
HROTTLE PRESS.	2384.1	2399.8	2394	2393.8	2394.2	2388.9	2477.14	2393.3	2382.4
THROTTLE TEMP.	1004.9	1007.2	1000.8	1001.5	996.5	1006.6	988.2	1008.8	1001.
101 REHEAT TEMP.	1000.2	1001.3	1009.2	1006.2	1003.1		996.3	1001.6	1007.5
EXHAUST PRESS.	3.739	3.074	3,809	3.403	3.599	3.513	3.195	2.063	2.95
FONER FACIDA	0.987	0.991	0.989	1	0.989	1	1	0.996	0.99
H2 PRESSURE	64	58	<b>64</b>	64	64	62	63	63	63
TEST HEAT RATE	7863.6	7986.8	7863.3	7865.2	7855	7872.3	7772.3	7762.8	7791.8
EST LOAD	855119	591526	858986	785201	859887	774305	898356	599283	788480
HEAT RAVE CORRECTIONS	(dividing	factors)	;						
řĪ	1.0007	1.0006	1.0005	1.0006	1.0005	1.0008	0.9983	1.0009	1.0010
Ĭ l	0.7993	0.9990	0.7999	0.9998	1.0008	0.9990	1.0019	0,9788	0.9997
THRH	1.0000	0,9998	0,9987	0.9991	0.9996	0.9994	1.0005	0.9997	0.9989
FERH	1.0247	1.0219	1.0258	1.0217	1.0216	1.0245	1.0127	0.9935	1.0118
COMBINED CORR	1,0247	1.0212	1.0248	1.0211	1.0224	1.0237	1.0134	0.9929	1.011
LOAD CORRECTIONS (div	iding fact	ors):							
Pī	0.9885	0.9946	0.9926	0.9923	0.9927	0.9903	1.0264	0,9917	0.987
il	0.9996	0.9993	0.9999	0.9999	1.0004	0.9994	1.0012	0.9991	0.999
THAH	1.0001	1.0006	1.0043	1.0029	1.0015	1.0020	0.9983	1.0008	1.0035
PEXH	0.9759	0.9786	0.9749	0.9788	0.9788	0.9760	0.9875	1.0066	0.988
COMBINED CORR				0.9740		0.9679			0.979
REGESSTSMESSESTESKEESE PAON TENT HEAT DAYE									
CORR TEST HEAT RATE									
CORR TEST LOAD	886683	607794	883979	806176	88327 <i>6</i>	799958	886810	600425	80504

## CONTRACT CYCLE HEAT RATE AND LDAD

TEST POINT	2	3	4	5 _	6	7	β	9	10
SUMMARY OF YEST CONDI	ITIONS:								
MEAS'D LOAD	855960	592031	859850	785980	860755	775096	898356	599736	789272
THROTTLE FLOW	6183909	4056100	6220163	5570279	6224013	5477861	6496919	3978528	5527099
THROTTLE PRESS.	2384.1	2399.8	2394	2393.8	2394.2	2388.9	2477.14	2393.3	2382.4
THROTTLE TEMP.	1004.9	1007.2	1000.8	1001.5	996.5	1006.6	988.2	1008.8	1001.7
HOT REHEAT TEMP.	1000.2	1001.3	1009.2	1006.2	1003.1	1004.3	996.3	1001.6	1007.5
EXHAUST PRESS.	3.739	3.074	3.809	3.403	3.599	3.513	3.195	2.063	2.956
FOWER FACTOR	0.987	0.991	0,989	1	0.989	1	1	0.996	0,998
H2 PRESSURE	64	59	64			62	63	63	63
CONTRACT CYCLE									
	7958.85	8084.63	79B4.94	7977.65	7951.25	7996.85		7872.34	7897.17
LOAD	843804.9								
HEAT RATE CORRECTIONS	6 (dividing	factors	) ;						
PT	1.0007	1.0006	1.0005	1.0006	1.0005	1.0008	0.9983	1.0009	1.0010
TT	0.9993	0.9990	0.9999	0.9998	1.0004	0.9990	1.0019	0.9988	0.9997
THRH	1.0000	0.9998	0.9987	0.9991	0.9996	0.9994	1,0005	0.9997	0.9989
PEXH	1.0247	1.0219	1.0258	1.0217	1.0216	1.0245	1.0127	0.9935	1.0118
COMBINED CORR	1.0247	1.0212	1.0248	1.0211	1.0224	1.0237	1.0134	0.9929	1.0114
LOAD CORRECTIONS (div	iding fact	ors):							
PT	0.9885	0,9946	0.9926	0.9923	0.9927	0.9903	1.0264	0.9917	0.9876
11	0.9996	0.9993	0.9999	0.9999	1.0004	0.9994	1.0012	0.9991	0.9999
THRH	1.0001	1.0006	1.0043	1.0029	1.0015	1.0020	0.9983	1.0008	1.0035
PEXH	0.9759	0.9786	0.9749		0.9788		0.9875	1.0066	0.9884
COMBINED CORR	0.9644	0.9732		0.9740				0.9981	
我们到你们 化存代 有法 解解 有 经 化 化 非 報報 经 电	र हों। 140 45 पाठ की 50 de पार को पर पोर पोर पाठ की की की की की की		* 40 to 10 t			10 (00) (00) (00) (00) (00) (00) (00) (0			
CORR TEST HEAT RATE	7767.2	7916.5	7791.4	7812.4	7777.4	7811.6		7928.7	7808.4
CORR TEST LOAD .	874951	602734	872168	795887	871223	799447	***************************************	594212	794286

 $\begin{array}{c} \text{Nohol} \\ \text{summry of } \underline{\text{TEST CONDITIONS}} \end{array}$ 

TEST PT.	2	3	4	5	6	7	8	9	10
UPLUE PT.	VMO	2nd	VWO	3rd	VMO	3rd	VHO	2nd	3rd
LORD (MM)	855.96	592.03	859.85	785.98	860.76	775.10	898.36	599.74	789.27
THROTTLE FLOW (LB/HR)	6183909	4056100	6220163	5570279	6224013	5477861	6496919	3978528	5527099
THROTTLE PRESS. (PSIA)	2384.1	2399.8	2394.0	2393.8	2394.2	2386.9	2477.1	2393.3	2382.4
THROTTLE TEMP. (F)	1004.9	1007.2	1000.8	1001.5	996.5	1006.6	988.2	1008.8	1001.7
FIRST STAGE PRESS.	1918.0	1235.5	1926.2	1714.3	1927.3	1689.8	1992.9	1212.3	1698.8
HOT REHEAT PRESS.	521.4	354.	194	1.2		7	The state of the s	100	7 18
HOT REHEAT TEMP.	1000,20	1001		er with		7045	: :	est C	Points.
COLD REHEAT PRESS.	566.0	384.				1 1		Conditions	10
COLO REHEAT TEMP.	625.1	566.			7.1	2001		69 3	A S
LP BOHL PRESS.	118.5	81.0				abutinpon		from Contract Luck	Summory
CROSSOVER TEMP. PSice	617.2	621.				f i		46	N HAVO
LP EXH. PRESS. ("HG)	1.836	1.51				2	Contract	GC 0	2
FINAL FW TEMP.	552.1	508.	30 3		N .	Coch	7 5 6		_
		A series of the				5	66		7
			and the state of t			De la	Cycle		each
		Summing or a string.	the spinor before			confector,	maked conditions		7
						3,	6		
									, Yesti

# SUMMARY OF TEST CONDITIONS

TEST PT.	2	3	4	5	6	7	8	9	10
VALUE PT.	VHO	2nd	VHO	3rd	VWO	3rd	VMO	2nd	3rd
LORD (MH)	855.96	592.03	859.85	785.98	860.76	775.10	898.36	599.74	789.27
THROTTLE FLOW (LB/HR)	6183909	4056100	6220163	5570279	6224013	5477861	6496919	3978528	5527099
THROTTLE PRESS. (PSIR)	2384.1	2399.8	2394.0	2393.8	2394.2	2380.9	2477.1	2393.3	2382.4
THROTTLE TEMP. (F)	1004.9	1007.2	1000.8	1001.5	996.5	1006.6	988.2	1008.8	1001.7
FIRST STAGE PRESS.	1918.0	1235.5	1926.2	1714.3	1927.3	1689.8	1992.9	1212.3	1698.8
HOT REHEAT PRESS.	521.4	354.0	526.1	475.0	527.6	467.6	544.5	348.7	473.0
HOT REHEAT TEMP.	1000.20	1001.30	1009.20	1006.20	1003.10	1004.30	996.30	1001.60	1007.50
COLD REHEAT PRESS.	566.0	384.3	571.2	514.8	571.5	507.0	590.0	378.4	512.7
COLD REHEAT TEMP.	625.1	566.8	623.0	606.1	619.3	607.3	612.1	565.5	606.5
LP BOWL PRESS.	118.5	81.0	118.9	107.5	110.6	106.1	122.7	79.5	107.5
CROSSOVER TEMP. PSIC	617.2	621.2	623.6	622.9	618.8	621.5	612.8	622.1	624.6
LP EXH. PRESS. ("HG)	1.836	1.510	1.871	1.671	1.768	1.725	1.569	1.013	1.452
FINAL FW TEMP.	552.1	500.5	551.9	540.9	551.6	539.1	554.3	506.5	540.7

FIG. 5

#### SUMMARY OF TEST CONDITIONS

TEST PT.	2	3	4	5	6	7	8	9	10
VALVE PT.	VHO	2nd	VHO	3rd	VMO	3rd	VWO	2nd	3rd
LORD (MH)	855.96	592.03	859.85	785.98	860.76	775.10	898.36	599.74	789.27
THROTTLE FLOW (LB/HR)	6183909	4056100	6220163	5570279	6224013	5477861	6496919	397.8528	5527099
THROTTLE PRESS. (PSIR)	2384.1	2399.8	2394.0	2393.8	2394.2	2388.9	2477.1	2393.3	2382.4
THROTTLE TEMP. (F)	1004.9	1007.2	1000.8	1001.5	996.5	1006.6	988.2	1008.8	1001.7
FIRST STAGE PRESS.	1918.0	1235.5	1926.2	1714.3	1927.3	1689.8	1992.9	1212.3	1698.8
HOT REHEAT PRESS.	521.4	354.0	526.1	475.0	527.6	467.6	544.5	348.7	473.0
HOT REHEAT TEMP.	1000.20	1001.30	1009.20	1006.20	1003.10	1004.30	996.30	1001.60	1007.50
COLD REHEAT PRESS.	566.0	384.3	571.2	514.8	571.5	507.0	590.0	378.4	512.7
COLD REHERT TEMP.	625.1	566.8	623.0	606.1	619.3	607.3	612.1	565.5	606.5
LP BOWL PRESS.	118.5	81.0	118.9	107.5	118.6	106.1	122.7	79.5	107.5
CROSSOVER TEMP.	617.2	621.2	623.6	622.9	618.8	621.5	612.8	622.1	624.6
LP EXH. PRESS. ("HG)	1.836	1.510	1.071	1.671	1.768	1.725	1.569	1.013	1.452
FINAL FW TEMP.	552.1	508.5	551.9	540.9	551.6	539.1	554.3	506.5	540.7

# INTERMOUNTAIN POWER CO.

Unit No. 2 T 151



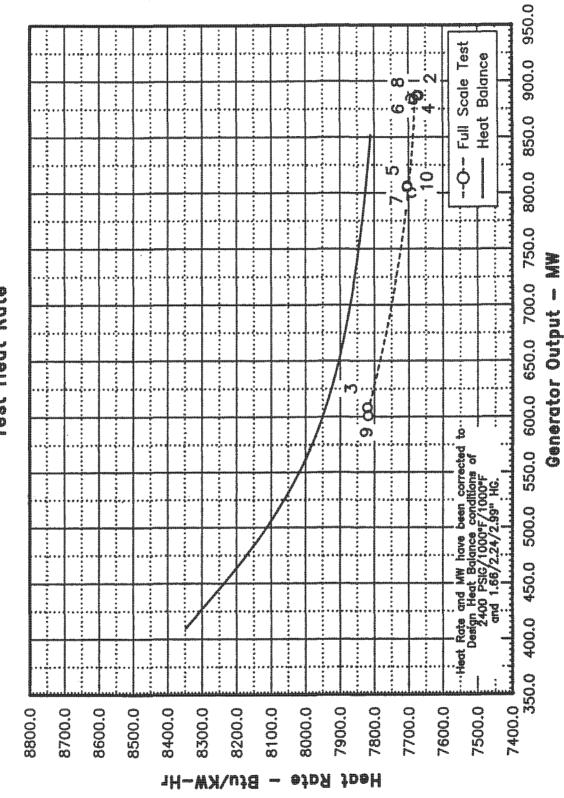
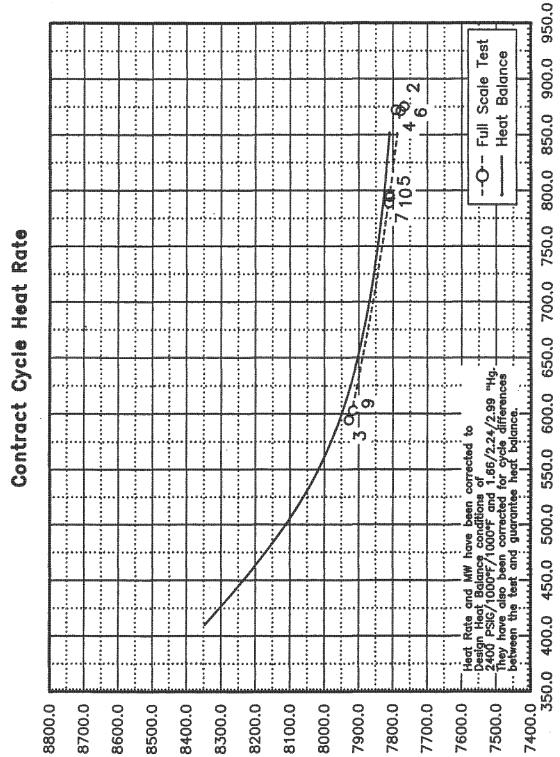


Fig. 15

INTERMOUNTAIN POWER CO.

Unit No. 2 T 151



Bfn/KM-Hr

Heat Rate

Fig. 16

Generator Output

## INTERMOUNTAIN POWER CO.

Unit No. 2 T 151

## **High Pressure Section Efficiency**

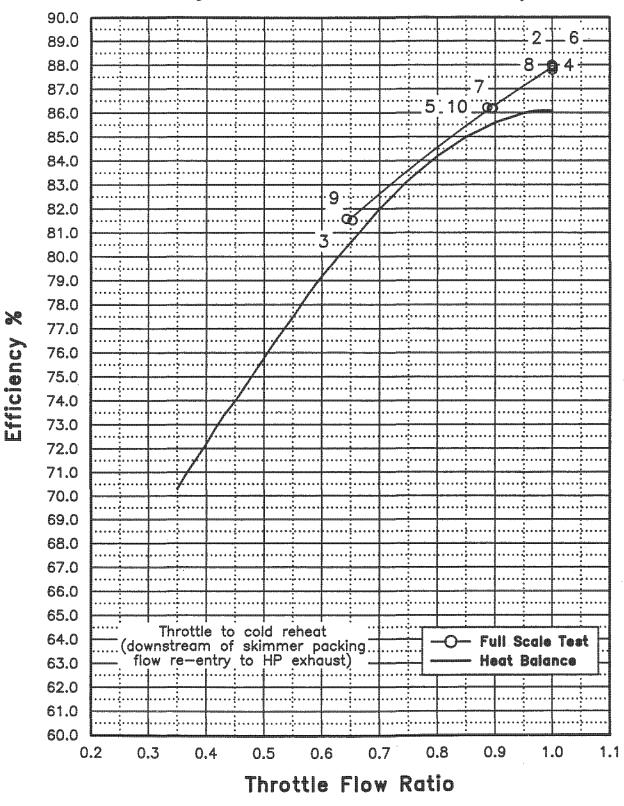


Figure 10

## INTERMOUNTAIN POWER CO.

Unit No. 2 T 151

## **High Pressure Section Efficiency**

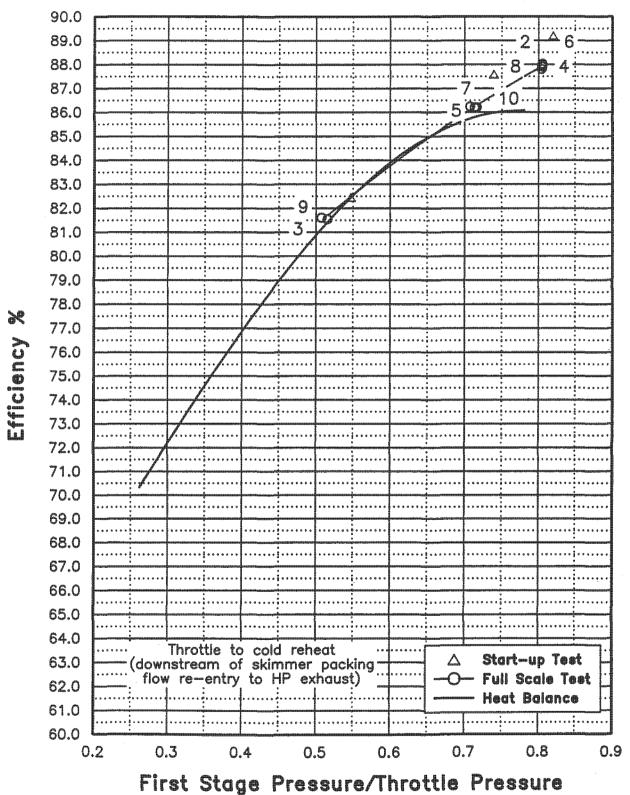


Figure 11

urt No. 2 T 51

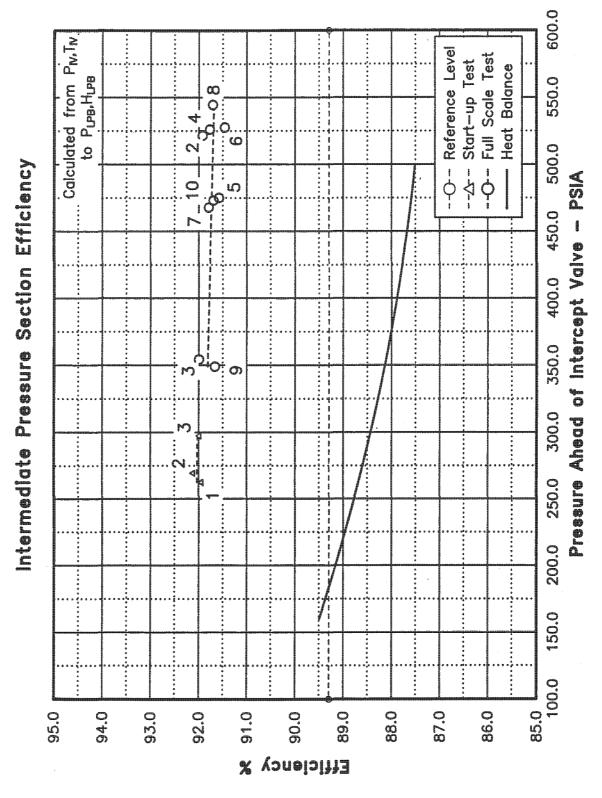


Fig. 12

PP No. 2

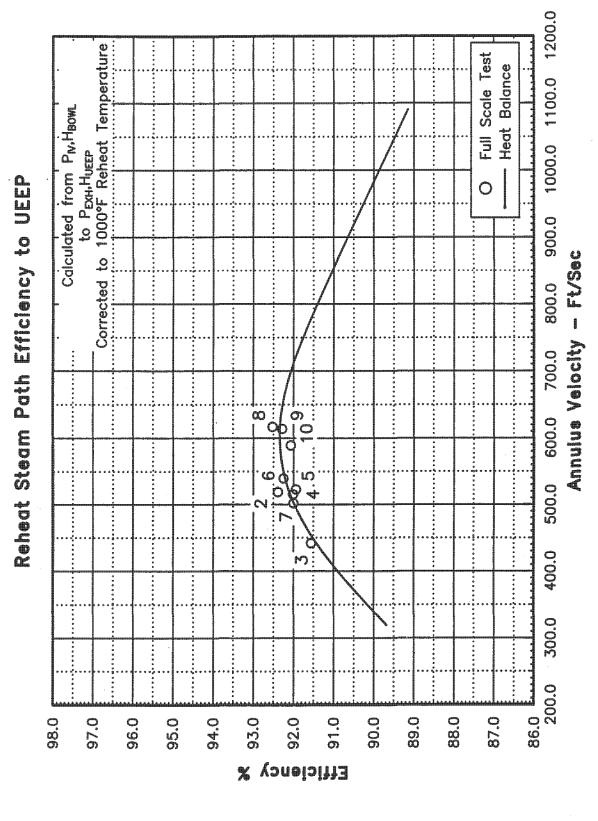
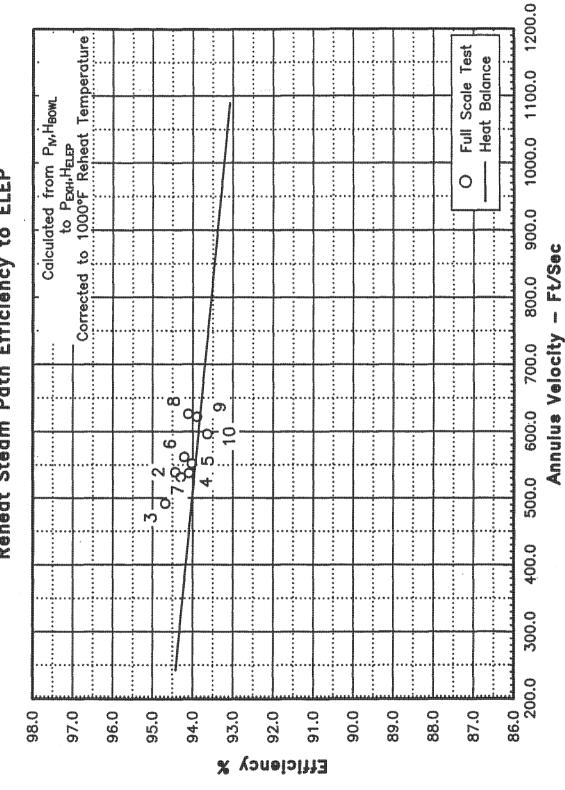


Fig. 13

PP No. 2

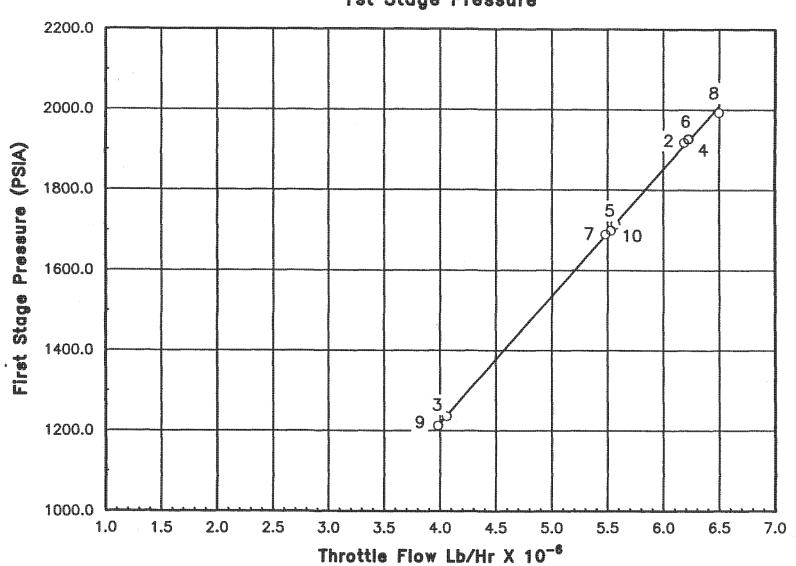




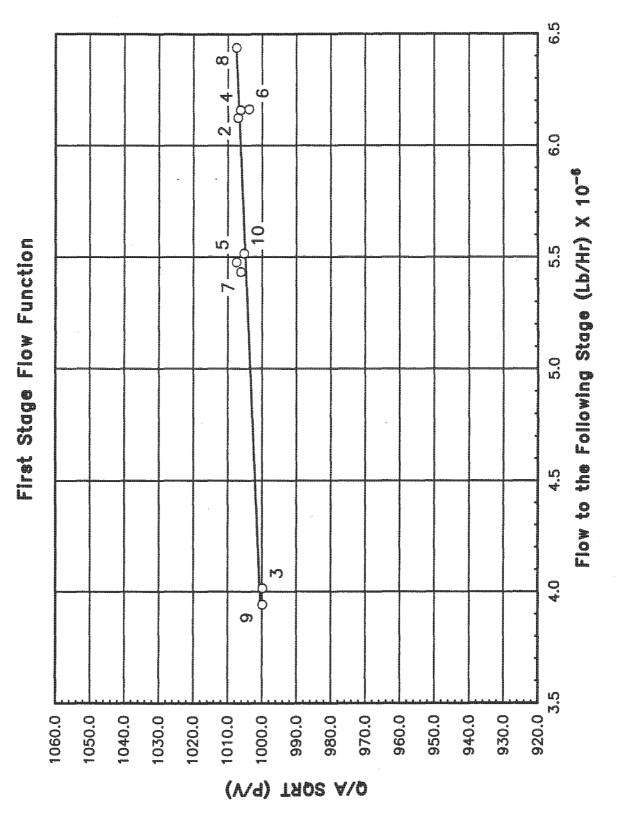
F16. 14

Unit No. 2 T 151

1st Stage Pressure



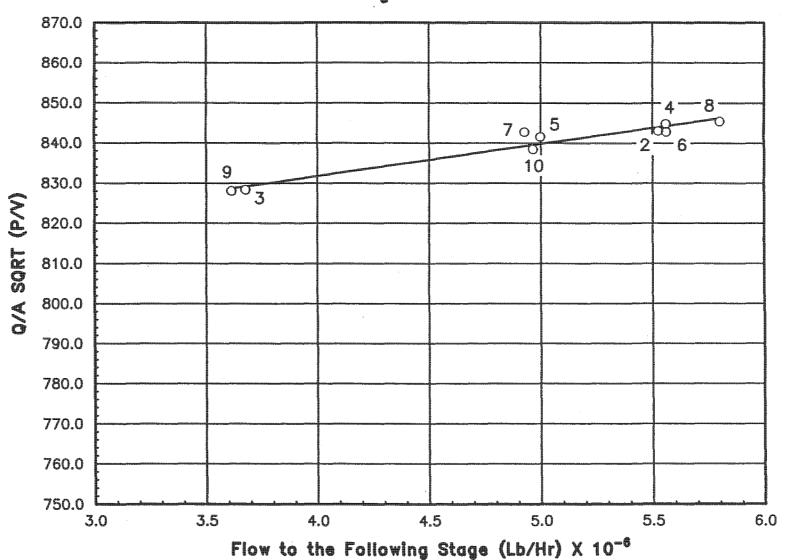
PP No. 2



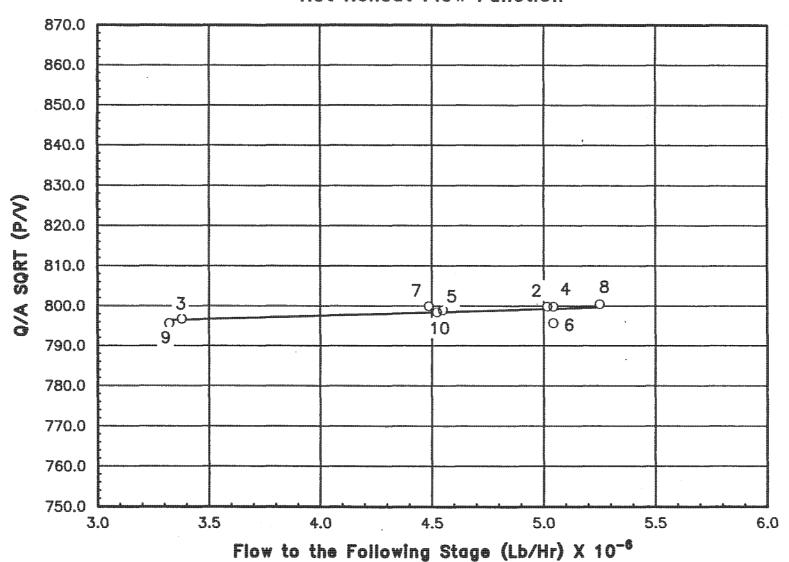
F16. 19

IPP No. 2

4th Stage Flow Function

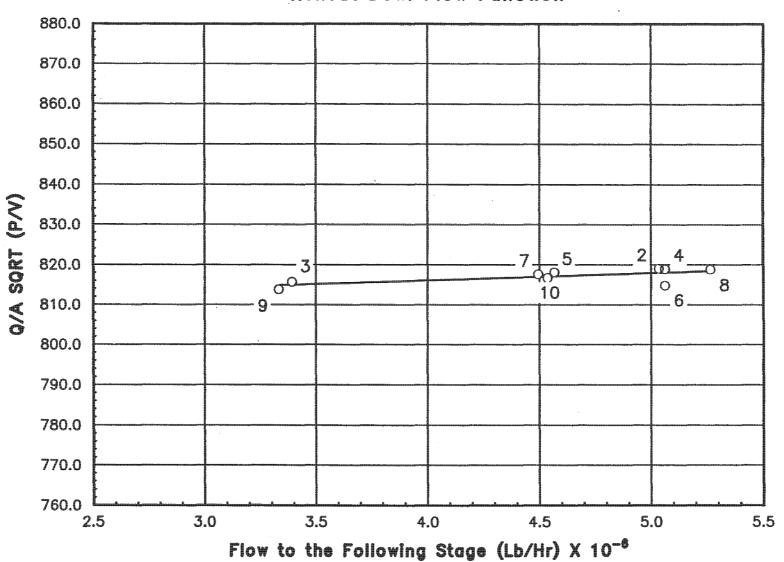


IPP No. 2 Hot Reheat Flow Function

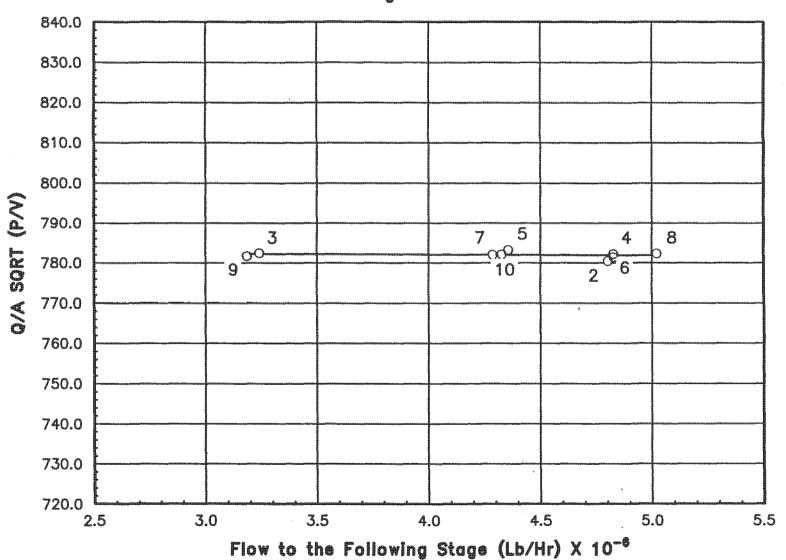


IPP No. 2

### Reheat Bowl Flow Function

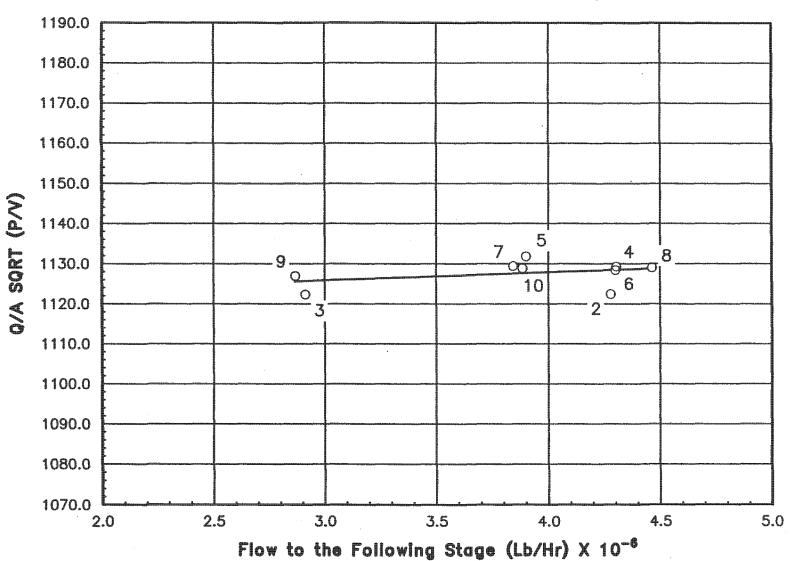


IPP No. 2
11th Stage Flow Function

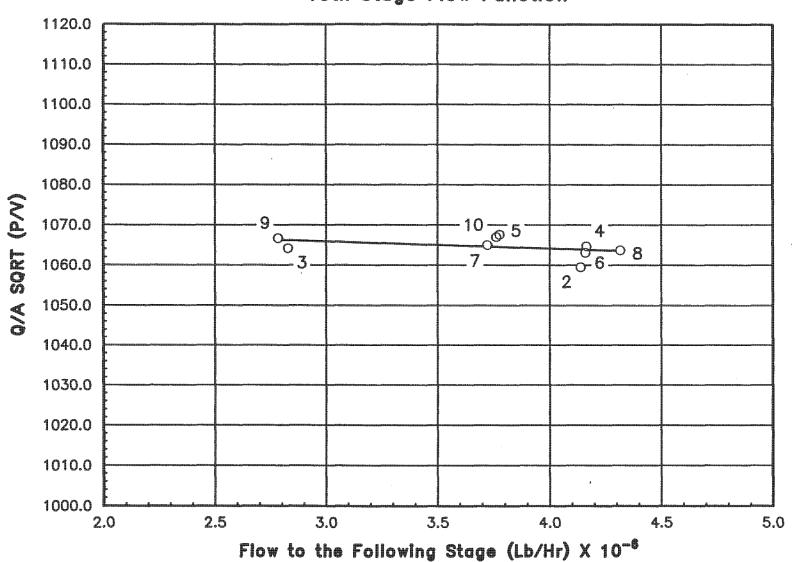


IPP No. 2

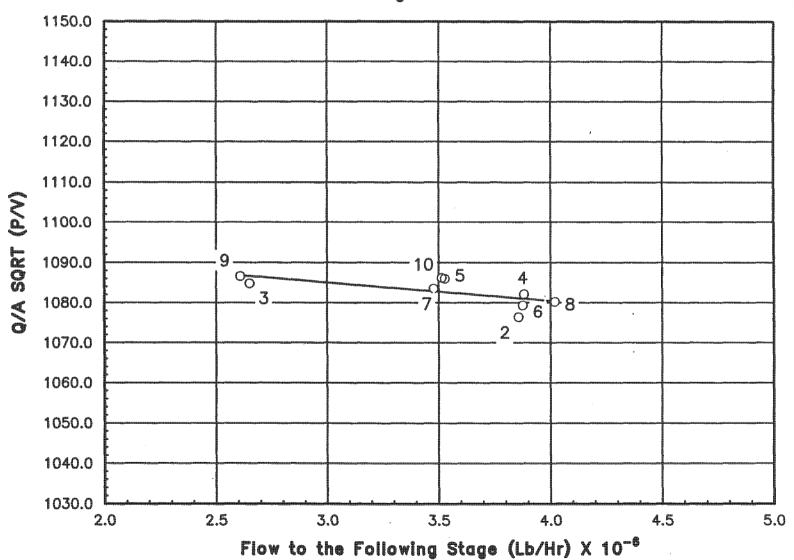
### Low Pressure Bowl Flow Function



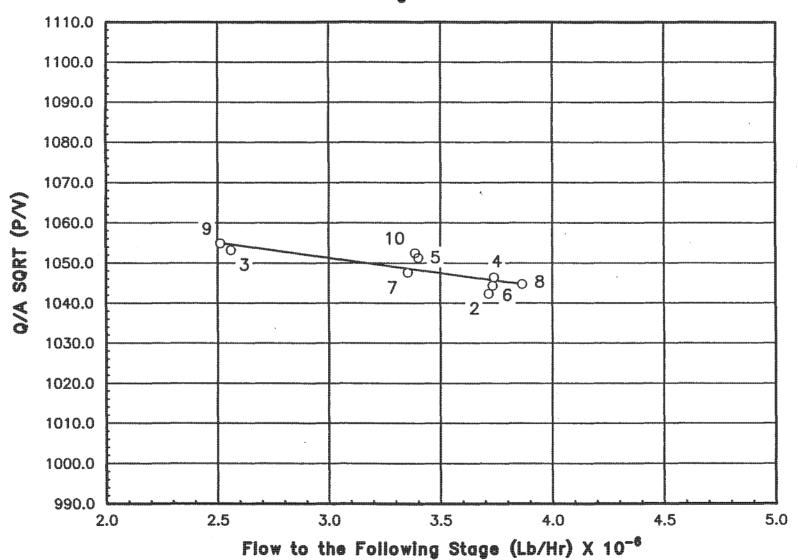
IPP No. 2 15th Stage Flow Function



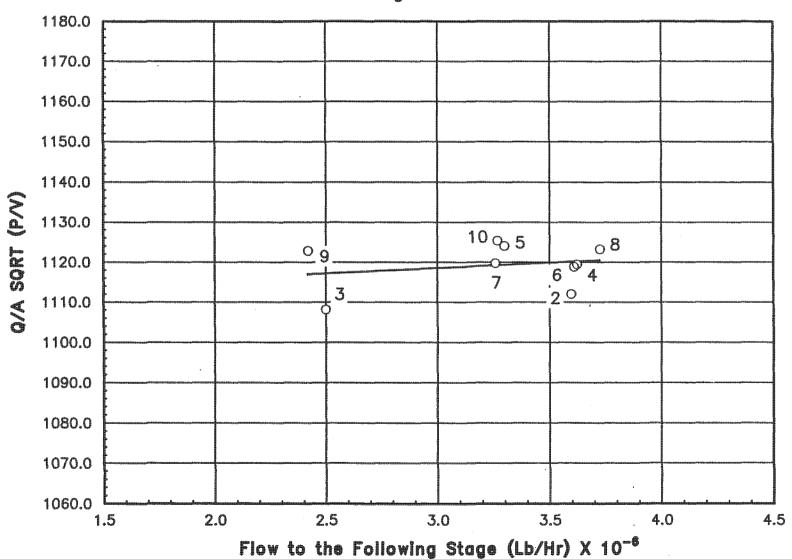
IPP No. 2
16th Stage Flow Function



IPP No. 2 18th Stage Flow Function



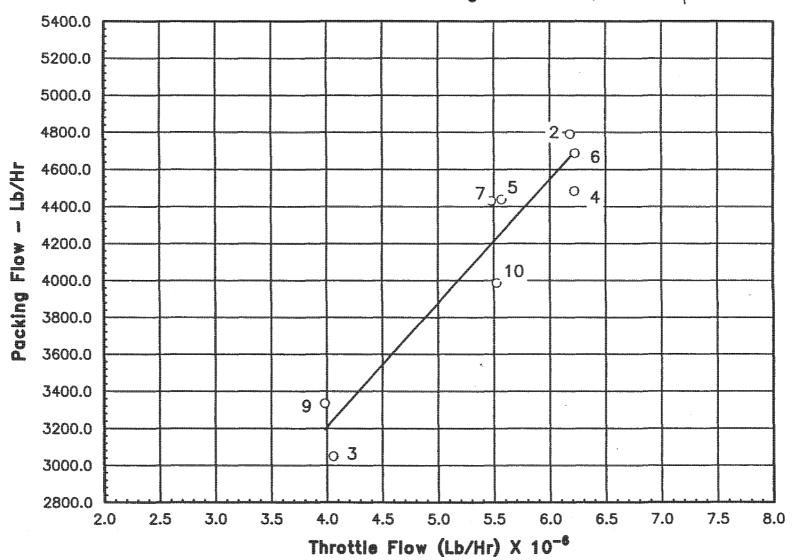
IPP No. 2 19th Stage Flow Function



Unit No. 2 T 151

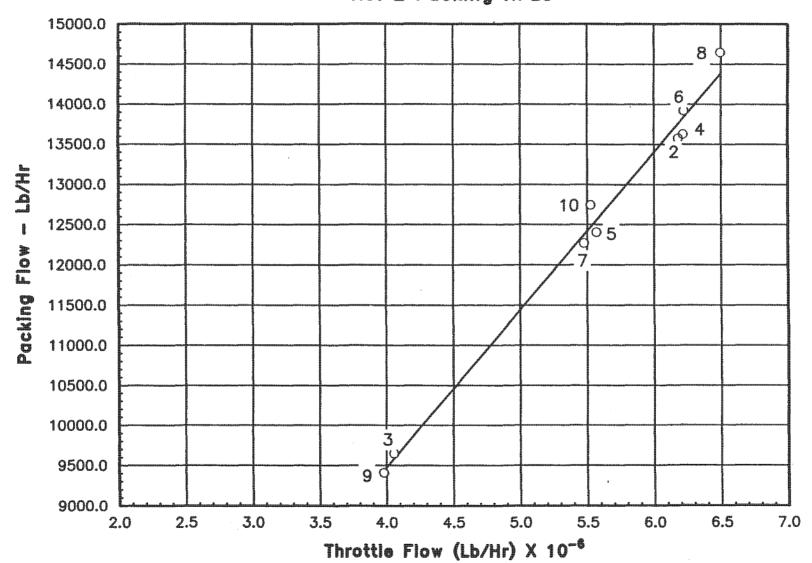


Steam Seals High Press Packing Leakoff



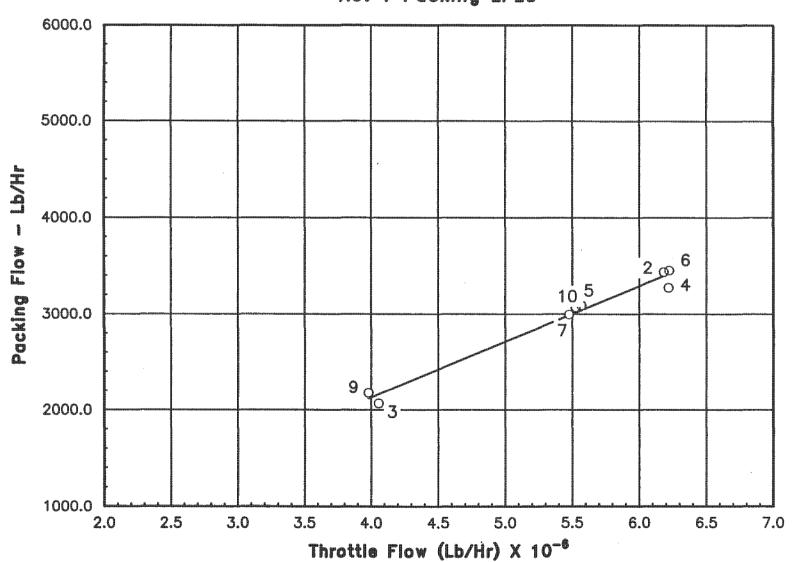
Unit No. 2 T 151

No. 2 Packing HPLO



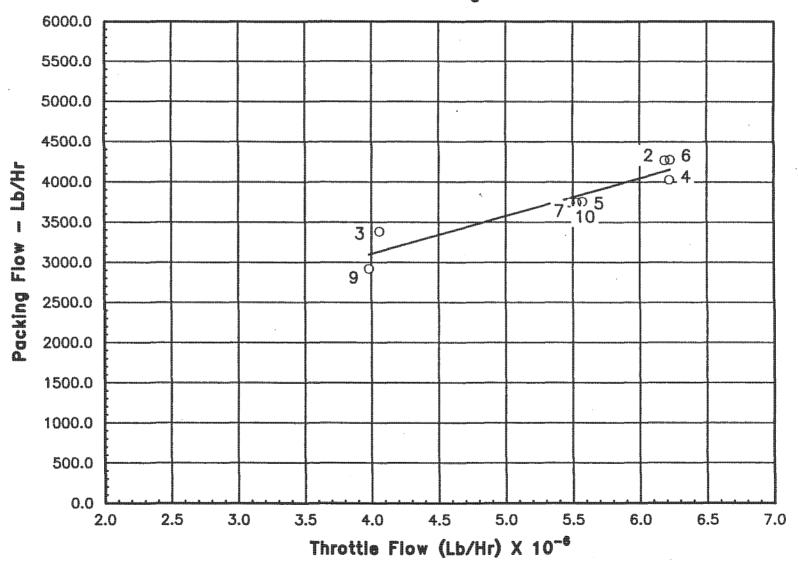
Unit No. 2 T 151

No. 1 Packing LPLO



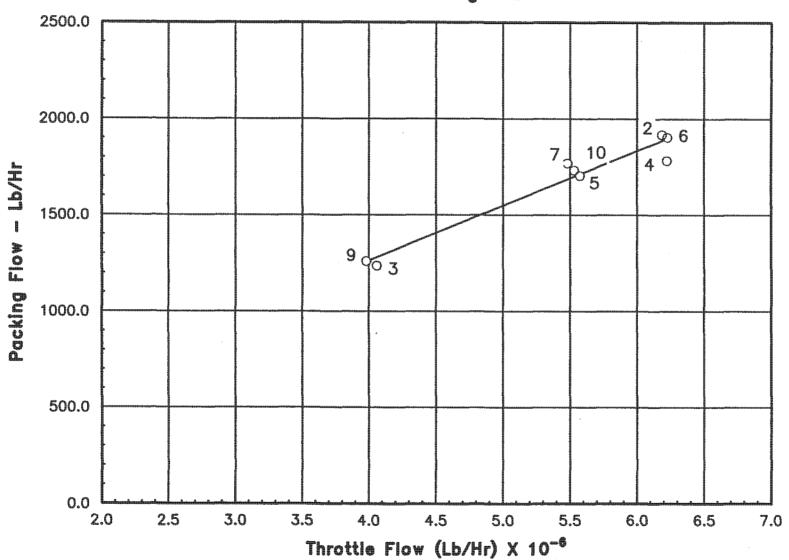
Unit No. 2 T 151

No. 2 Packing LPLO



Unit No. 2 T 151

No. 3 Packing LPLO



Unit No. 2 T 151 No. 4 Packing LPLO

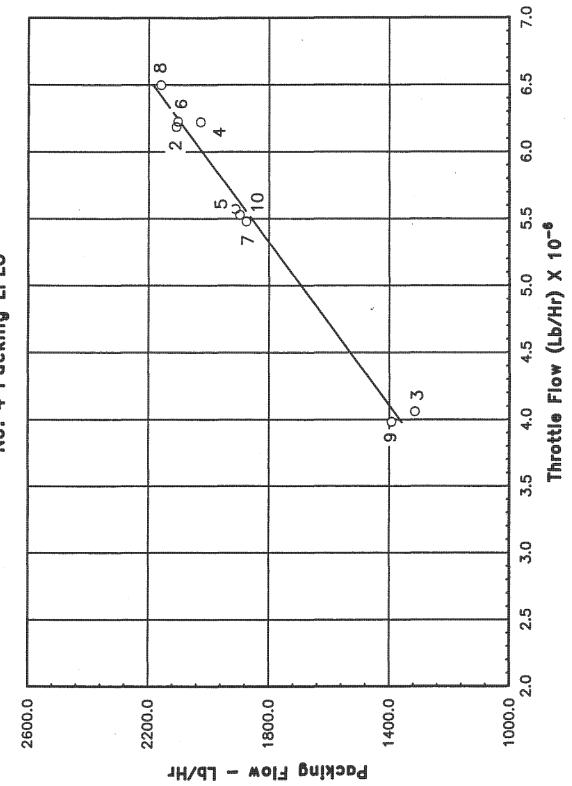
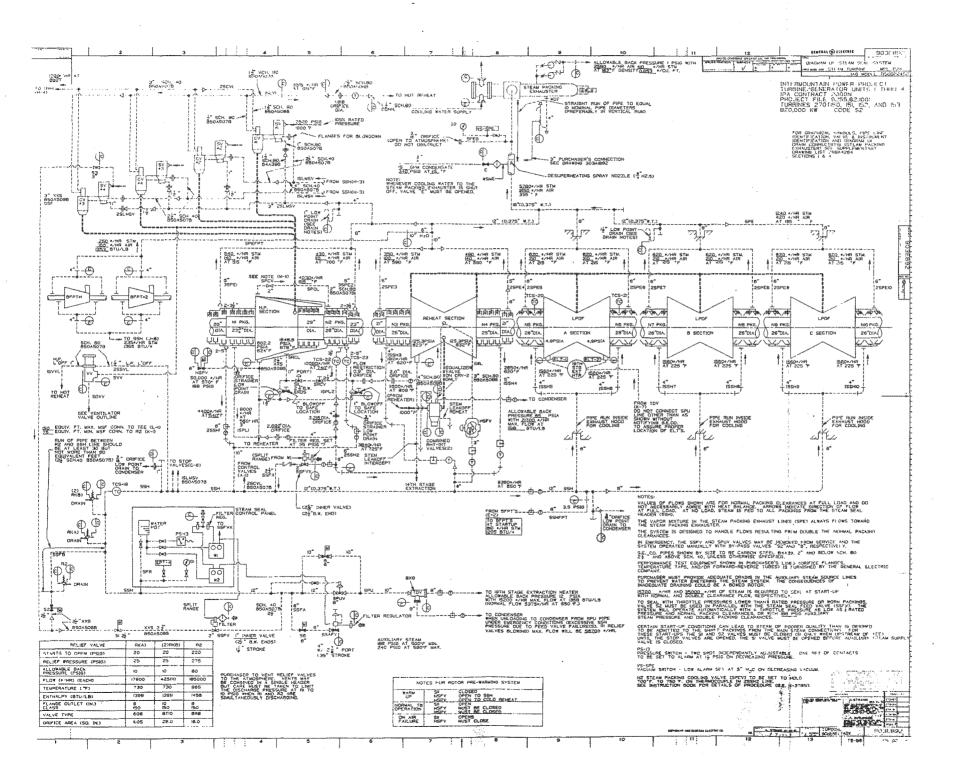
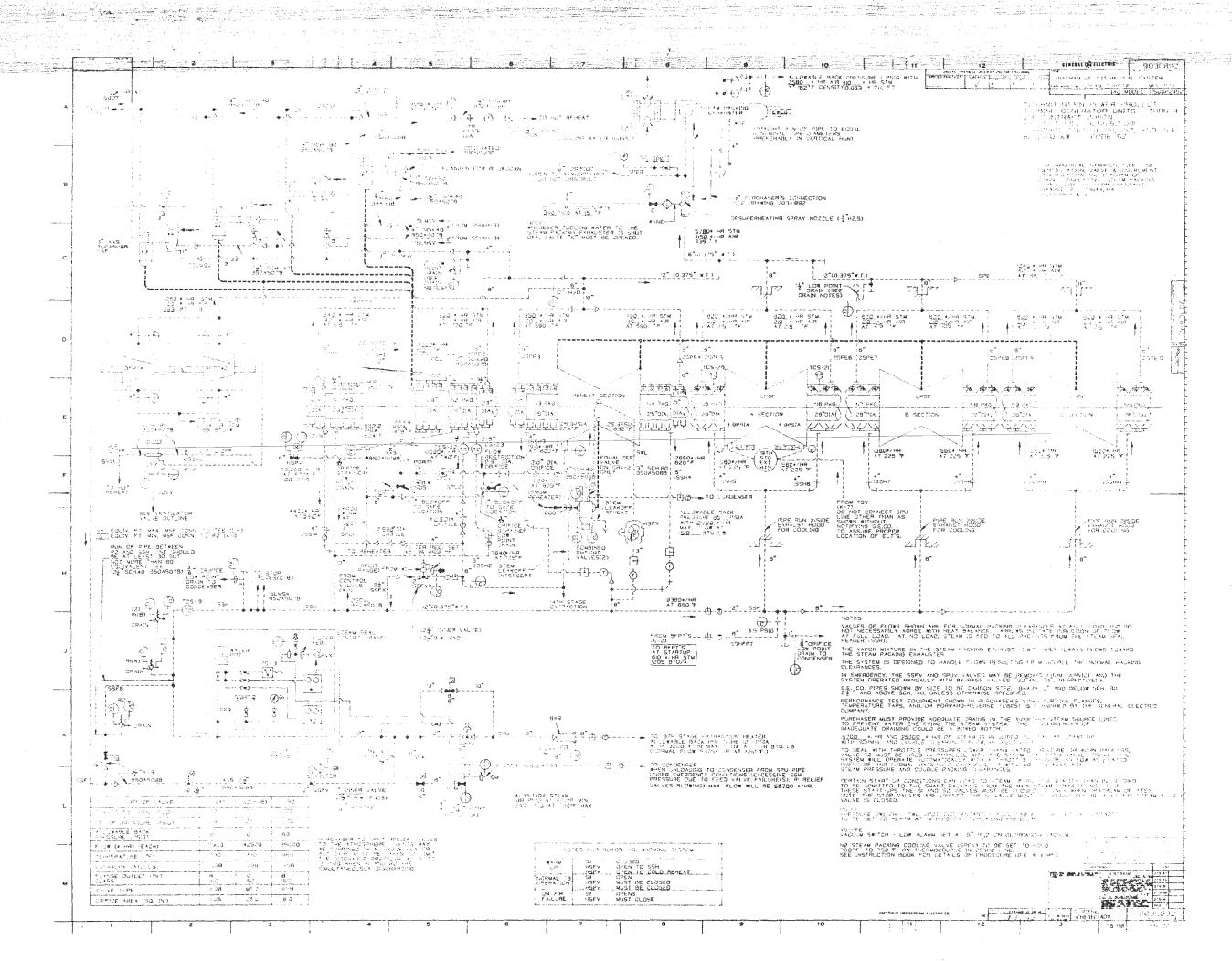


Fig. 34



Stan Stagram

F19.4



17 A

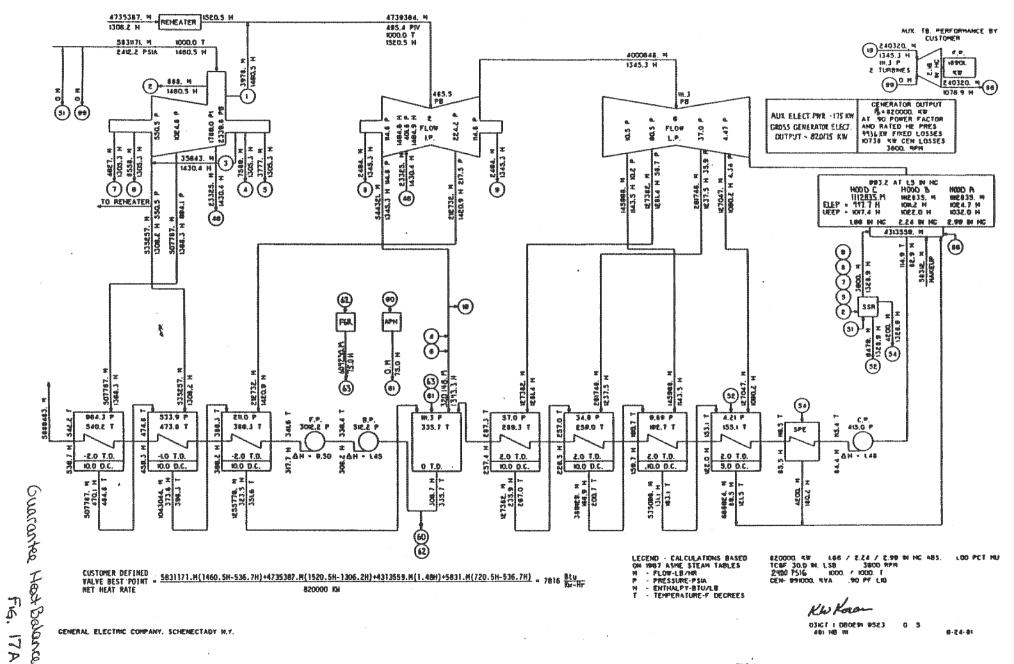


Fig. 17A

17B

### EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

### CALCULATED GATA - NOT CUARANTEED

RATHIC FLOW IS SB3187, HE AT MEET STEAM COMPTIONS OF EAULE MISS AND BOOGD T TO ASSURE THAT THE TURBING WILL MASS THIS FLOW CONSIDERING VARIATIONS HE FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DIPARMO AREAS, ETC MINCH HAT ARTEST THE FLOW, IME TURBING IS BEING DESIGNED FOR A DESIGN FLOW PRATHIC FLOW PLUS S,G MERCENTY OF BIZZTSC. HE

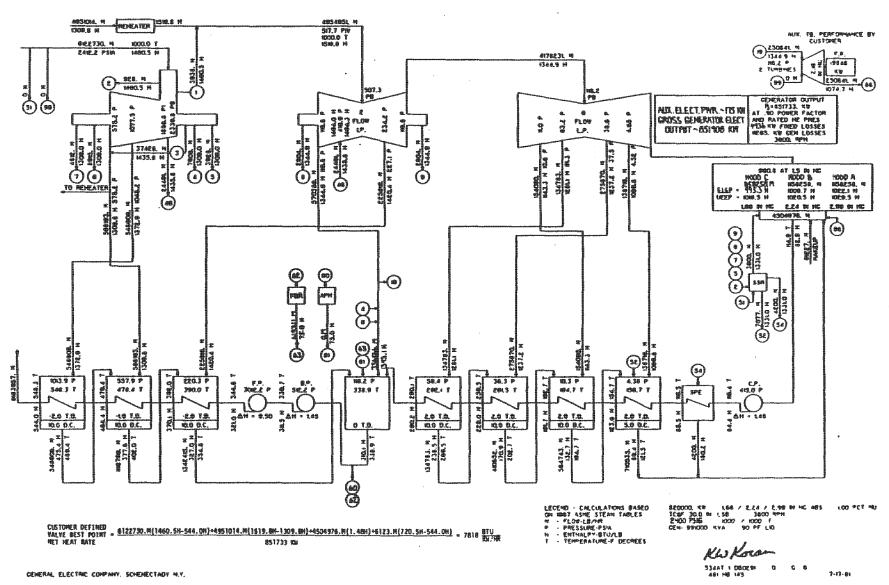
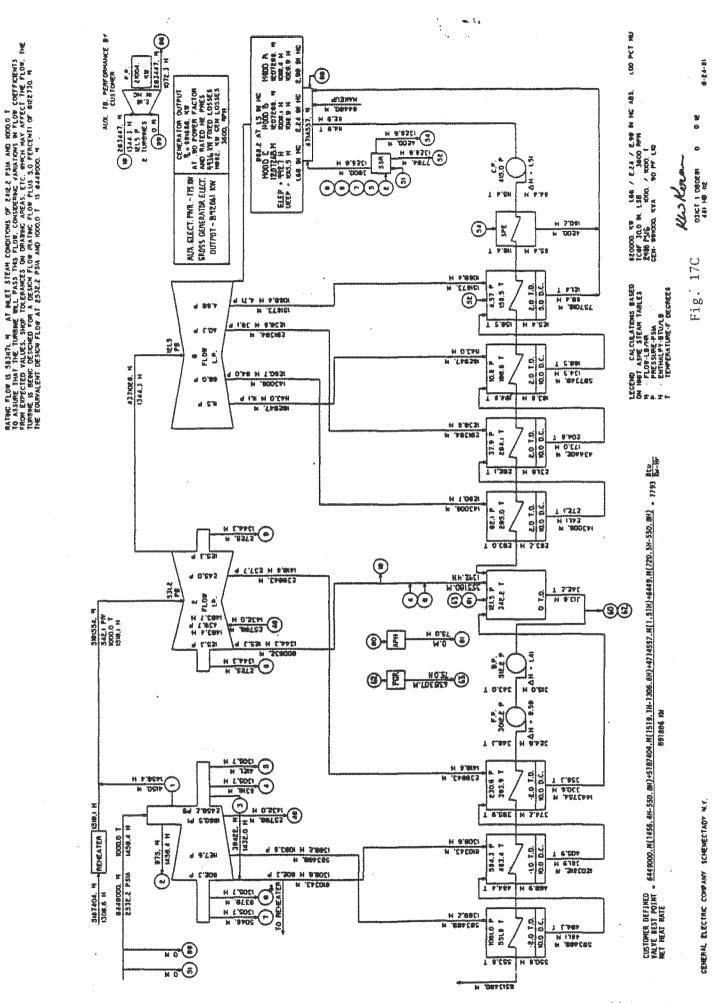


Fig. 17B



I

CALCULATED DATA - NOT CUARANTEED

EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

**P** 

481

YWO-OP Fig. 17C

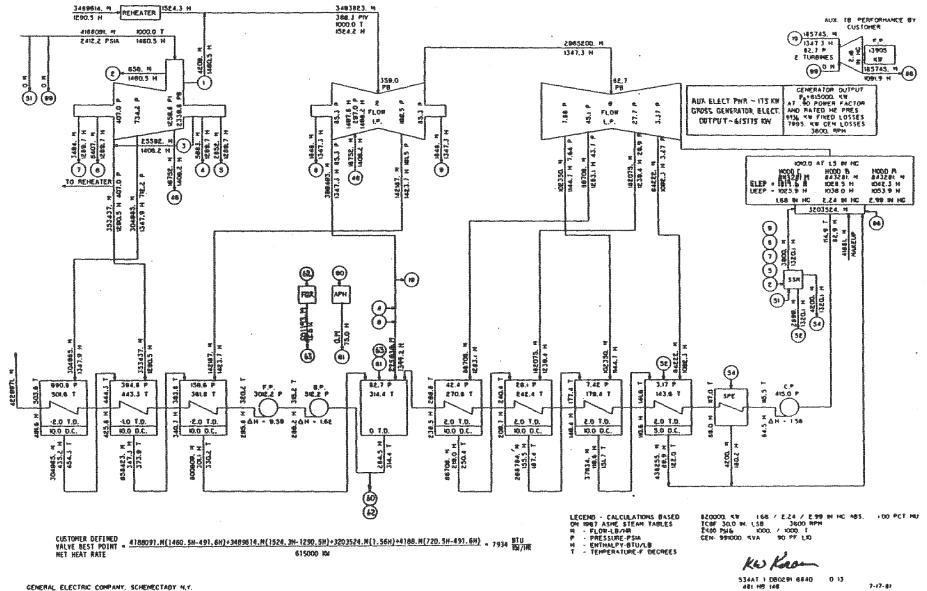
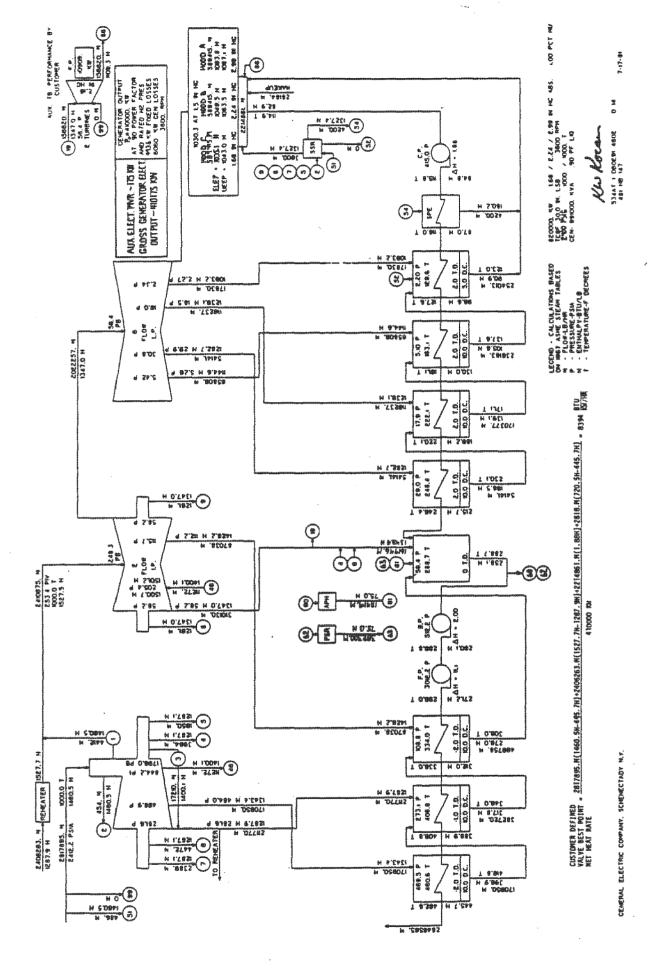


Fig. 17D

IP14\_004887 Fig. 17D

6154

481 HB 147



MOMM

Fig. 17 E

MUSOL

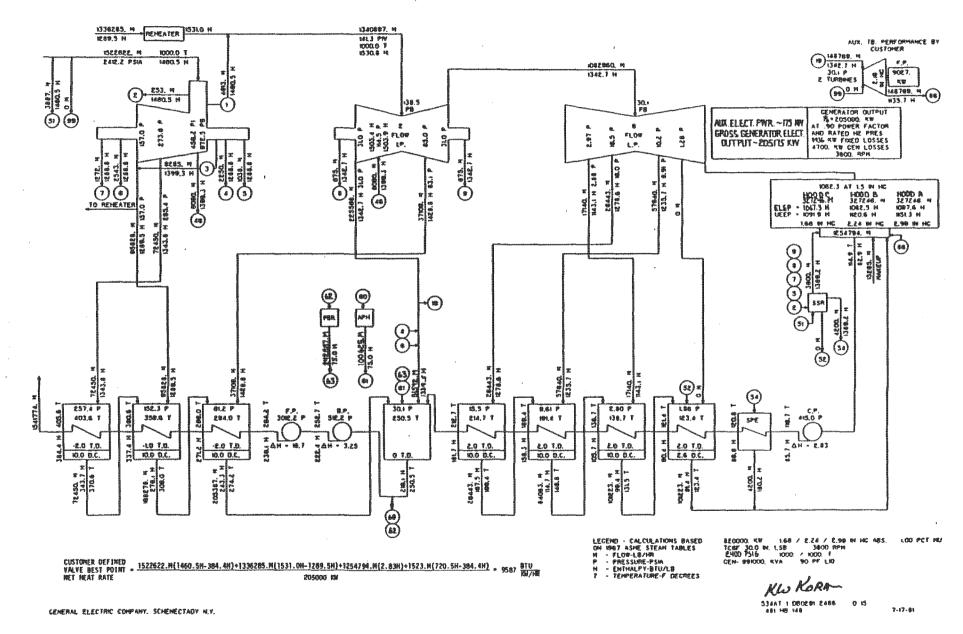


Fig. 17F

### TURBINE AND EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

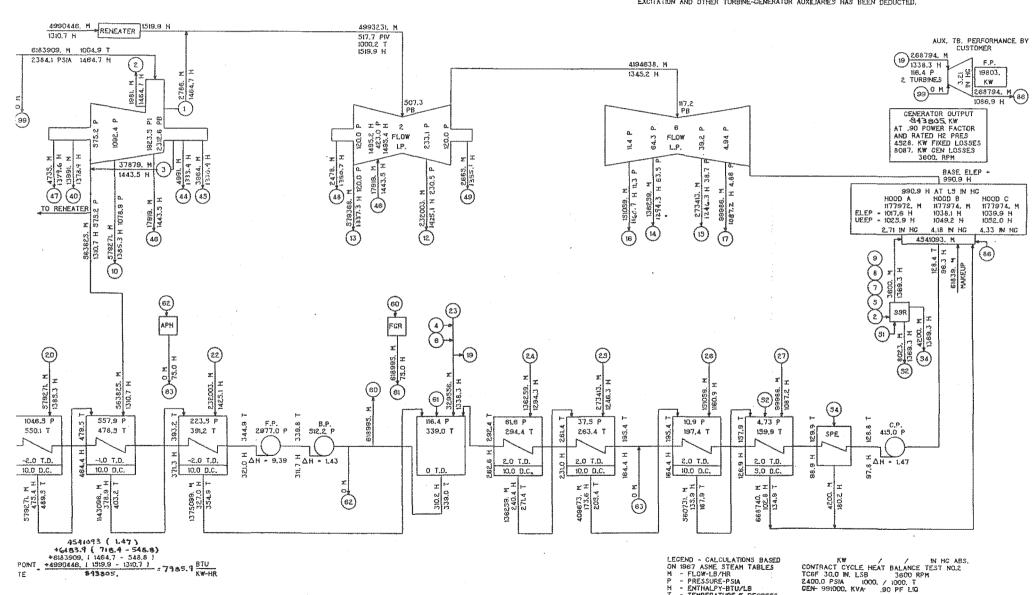
### CALCULATED DATA - NOT CUARANTEED

- PRESSURE-PSIA - ENTHALPY-BTU/LB - TEMPERATURE-F DEGREES

0 ;

9948T 1

RATING FLOW IS \$979059, H. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW, THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW HATING FLOW PLUS S.O PERCENT) OF 8278012. H THE EQUIVALENT DESIGN FLOW AT 2384.1 PSIA AND 1004.9 T IS 6183893, M. THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



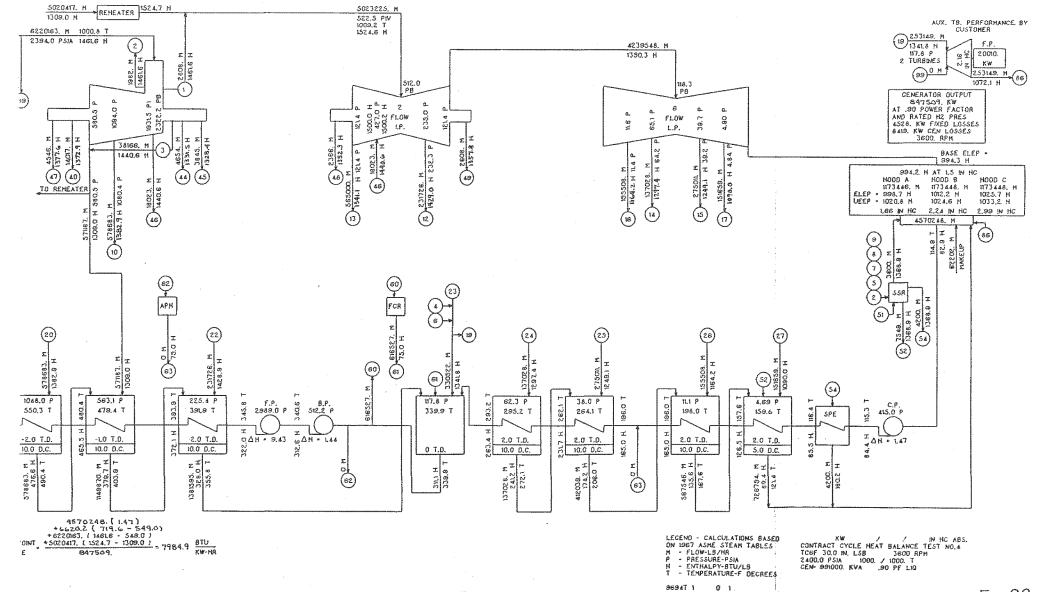
CONTRACT CYCLE HEAT BALANCE TEST No. 2

\$43505.

### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

### CALCULATED DATA - NOT CUARANTEED

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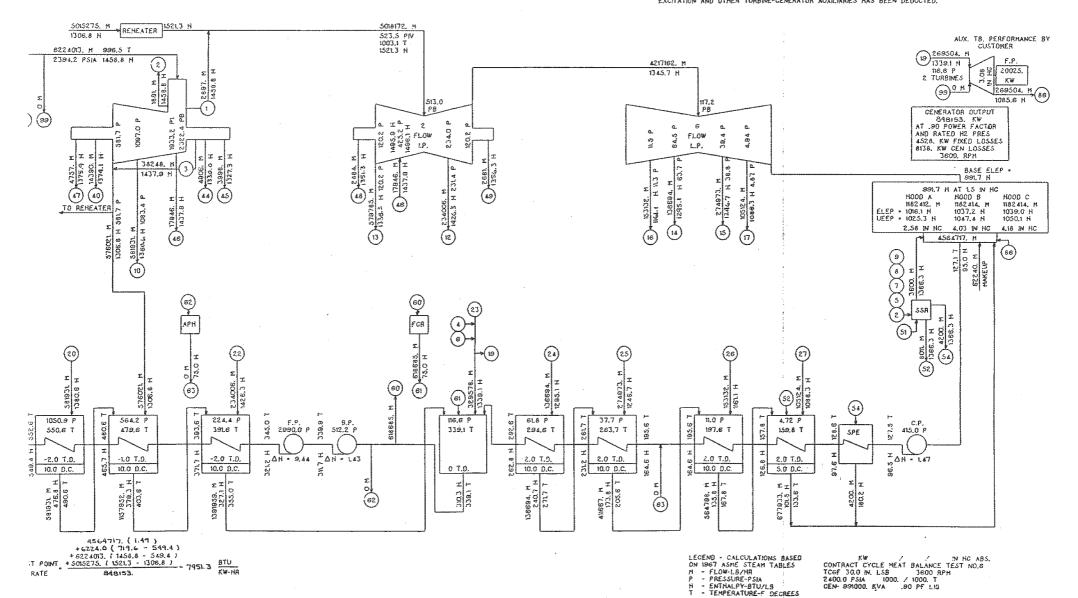


CONTRACT CYCLE HEAT BALANCE TEST No.4

### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

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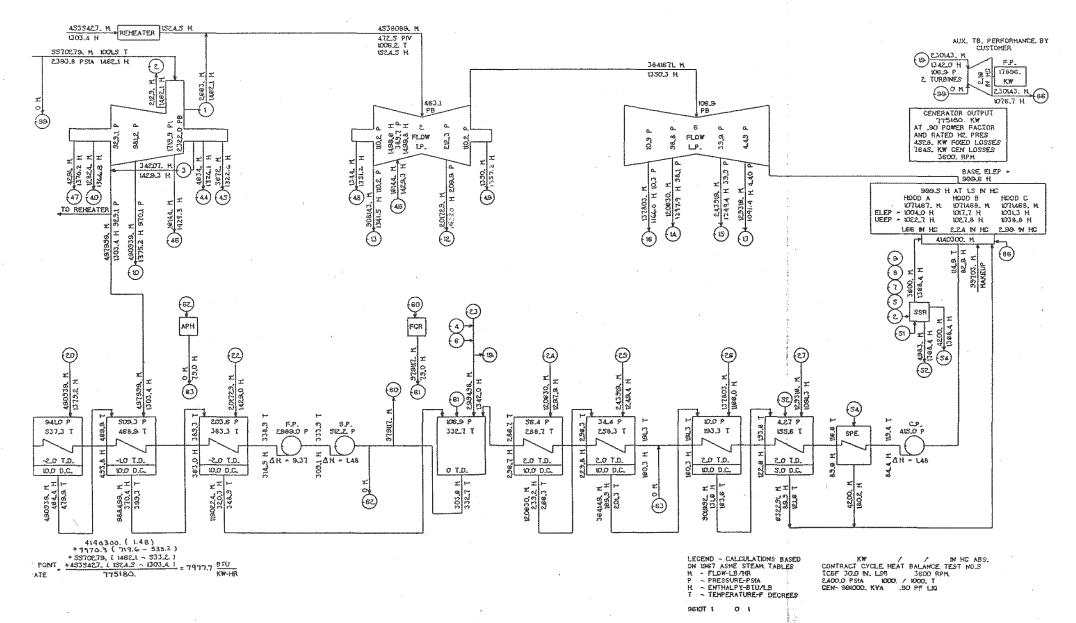
RATING FLOW IS \$963946, H. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS S.0 PERCENT) DF 6262143, M
THE EQUIVALENT DESIGN FLOW AT 2394.2 PSIA AND 996.5 T IS 6223999, M
THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR
EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



961JT 1

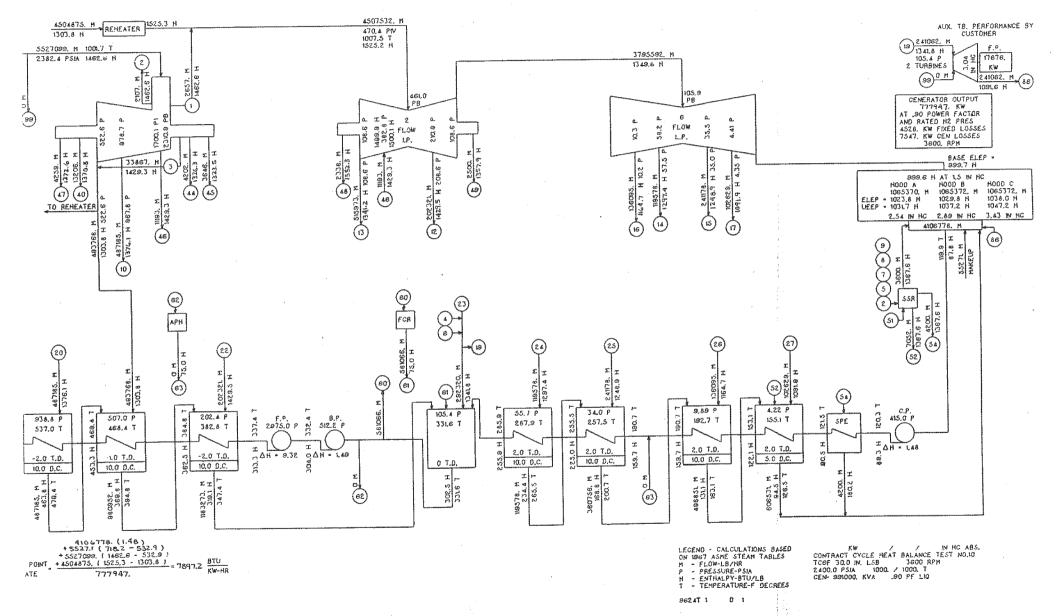
0 1

CONTRACT CYCLE HEAT BALANCE TEST No. 6

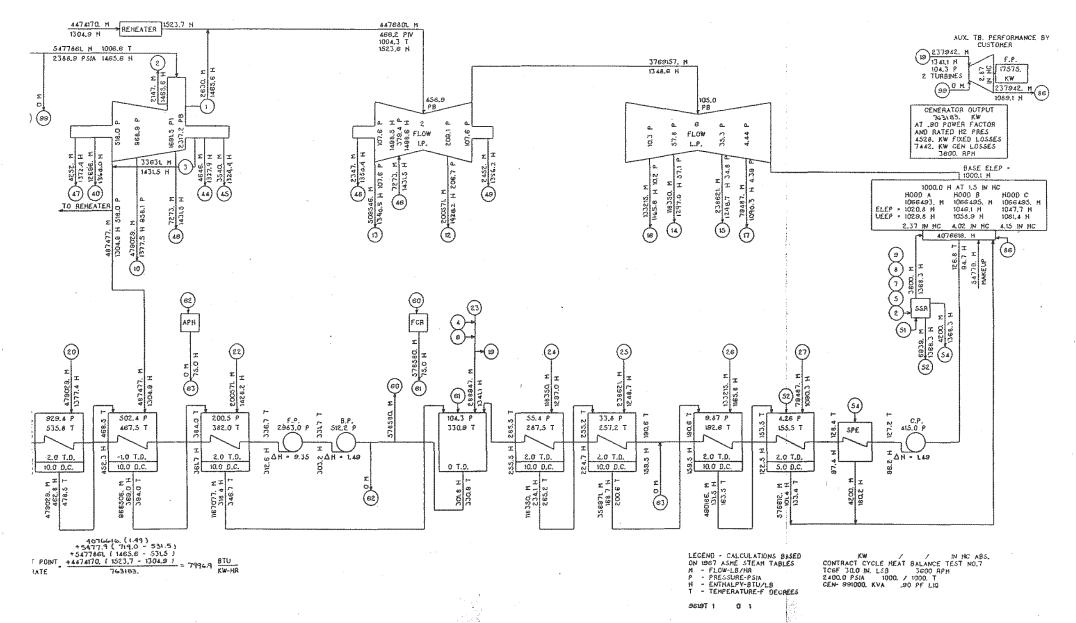


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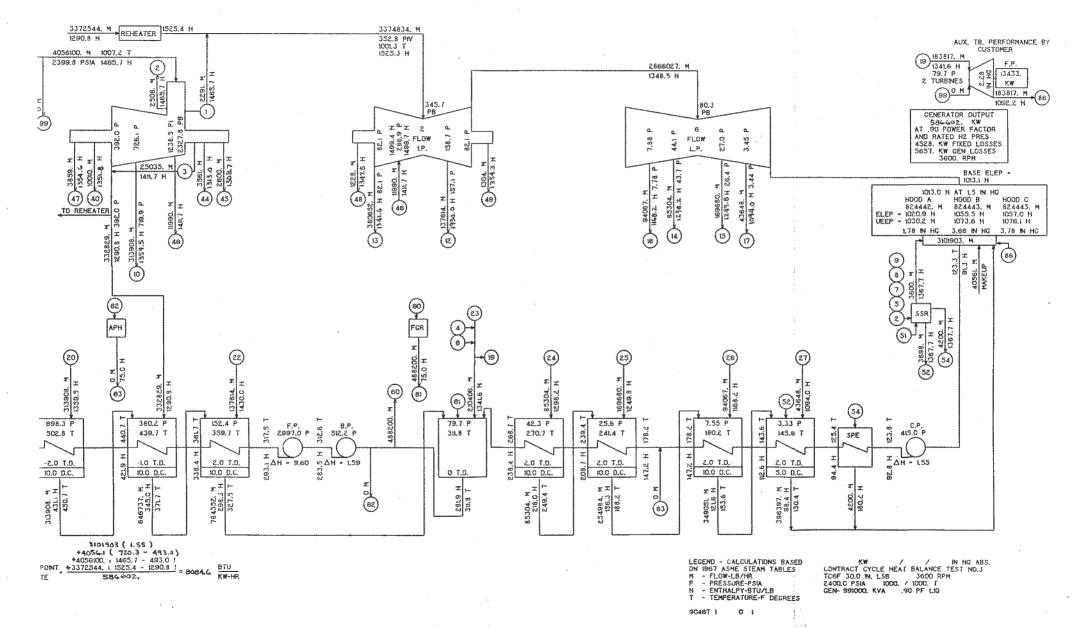
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IP14\_004894

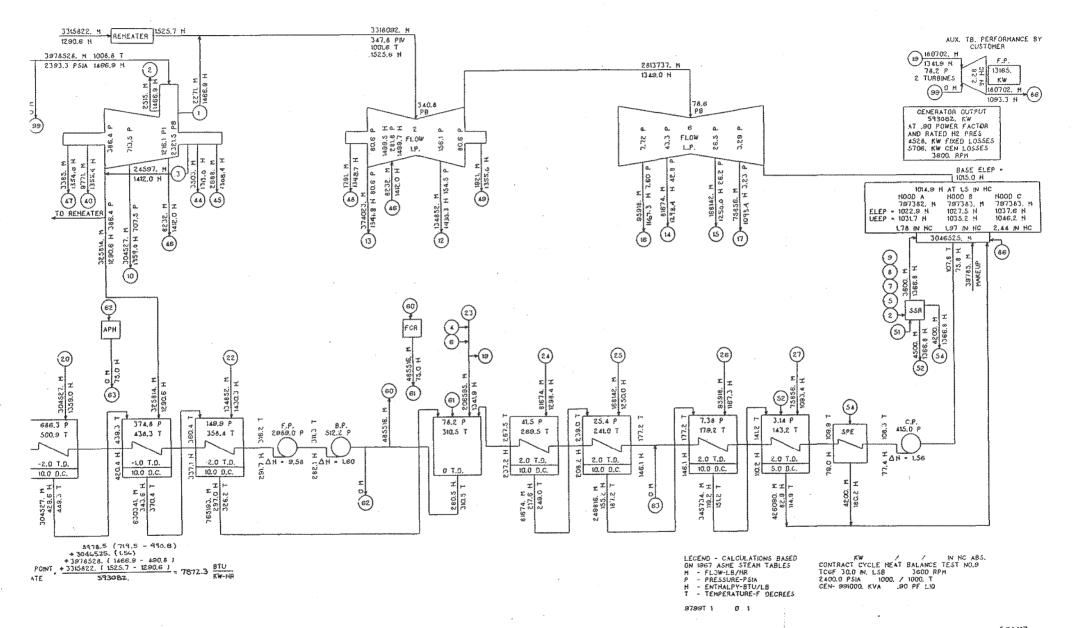


P14\_004895



P14\_004896

THE VALUE OF CEMERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CEMERATOR AUXILIARIES HAS BEEN DEDUCTED.



P14\_004897

-1013-8 (7-70)

# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

### APPENDIX A

Computer Output for Test Cycle Heat Balances for Test Points 2-10

### **Output Sheets**

These output sheets should be used in conjunction with the trunkline diagram shown in Figure A1.

The following is a list of the nomenclature used in these output sheets:

FW	Feedwater
Inj	Injection
Ret	Return
MU	Makeup
LO	Leakoff
Shell	Conditions in turbine
Exh	Exhaust
AE	Available energy
ELEP	Expansion line end point
UEEP	Used energy end point
$v_{AN}$	Annulus velocity
TL	Trunkline
P	Pressure - psia
T	Temperature - degrees F
H	Enthalpy, BTU/LB
Q	Flow, lb./hr.
SV	Specific volume - ft <sup>3</sup> /lb
SSR	Steam seal regulator

Pages 1 and 2 of the output sheets for each test point contain general information on turbine and cycle performance, such as heat rate, throttle flow, section efficiencies, and stage flow function. On page 1 under label "rated conditions", the load and heat rate have been corrected to rated power factor and rated H<sub>2</sub> pressure, and the throttle flow has been corrected to 2400 psig/1000F.

Page No. A1
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1013-8 (7-70) PHOTO OFFSET-TOS

## GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

Pages 3-6 include designated component information. The column (TL) to the left of each sheet is a trunkline number used to easily identify points in the cycle. These TL numbers correspond to the number on sheet A1.

Pages 7 and 8 are a tabulation of all information stored in all trunklines. Although much of the same information is already included on pages 3-6, it is reprinted in TL form because not all TL numbers are printed on pages 3-6 and it is easier under some circumstances to look up information on the TL printout.

The column headings for the TL sheets are from left to right (TL) trunkline number, (P) pressure-psia, (T) temperature -  $^{\circ}$ F, (H) enthalty - Btu/lb., (Q) flow lb./hr., (SV) specific volume-ft<sup>3</sup>/lb. in most cases, (SP) an additional fluid property needed in the calculation such as enthalpy, (PV)-(P)/(SV) in most cases but not all; and (TR) transient storage for information needed in the calculation. This last storage area will also contain (Q)/A  $\sqrt{(P)/(SV)}$ 

The page numbering system is as follows:

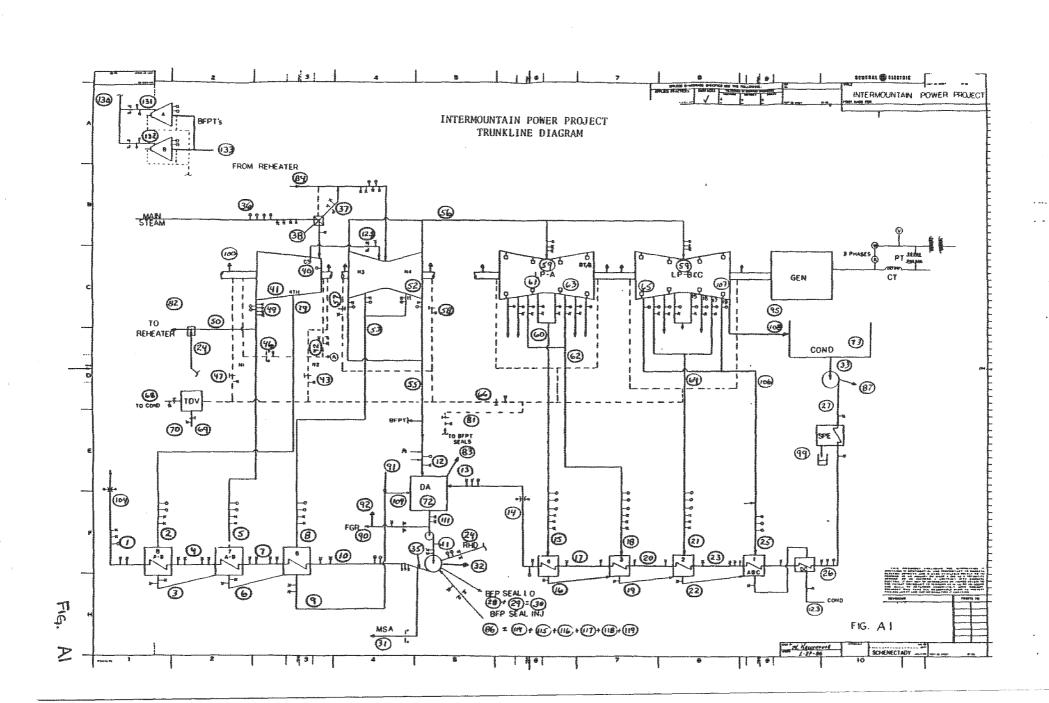
A0 3-1

where A is for appendix A and 3-1 identifies the test point as 3 and the page number as 1.

Page No. A2

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Maintain one-inch side margins.



INTERMOUNTAIN POWER PROJECT

INSTRUMENTATION DIAGRAM / POSTING SHEET

GENERAL & ELECTRIC

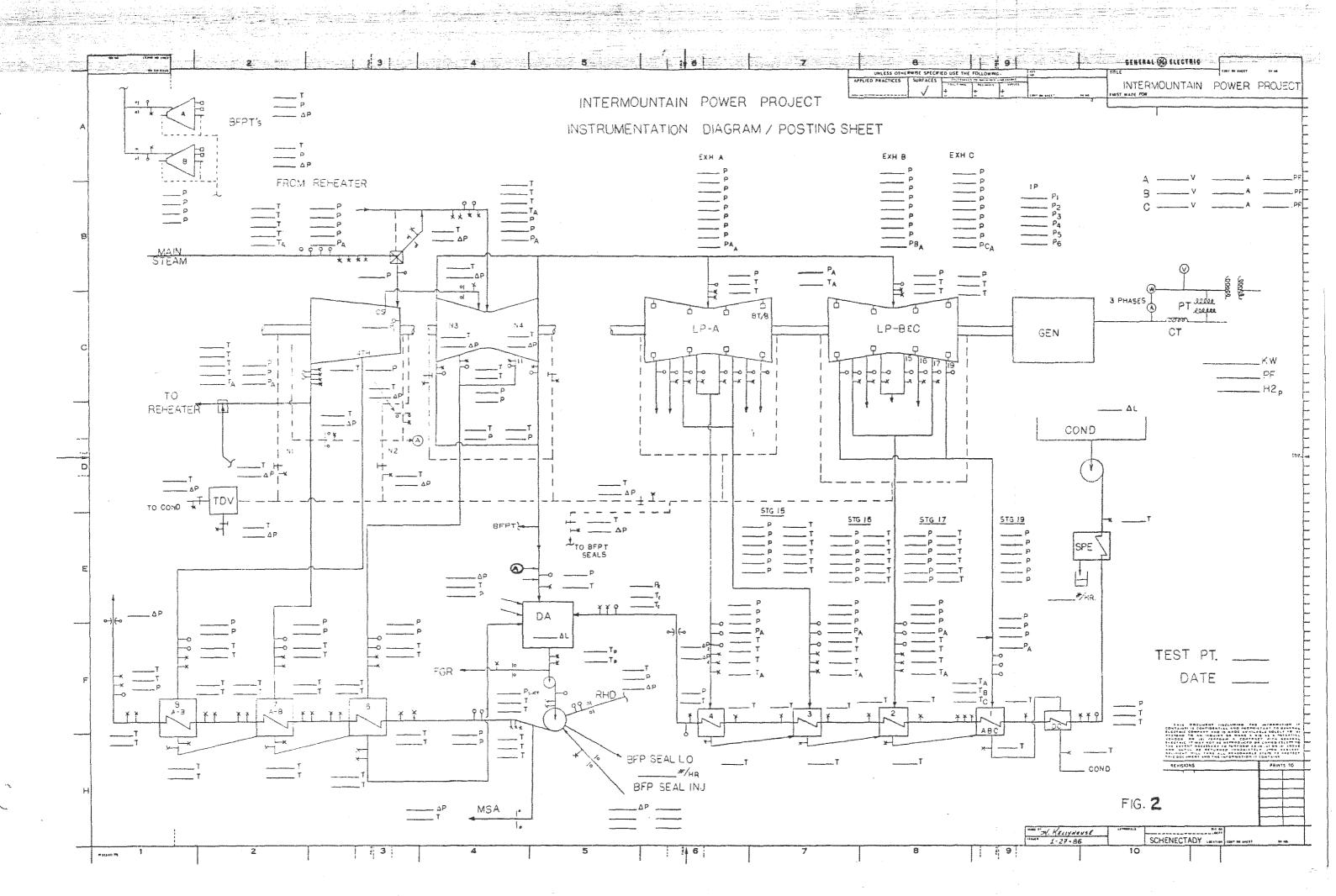
EXH C

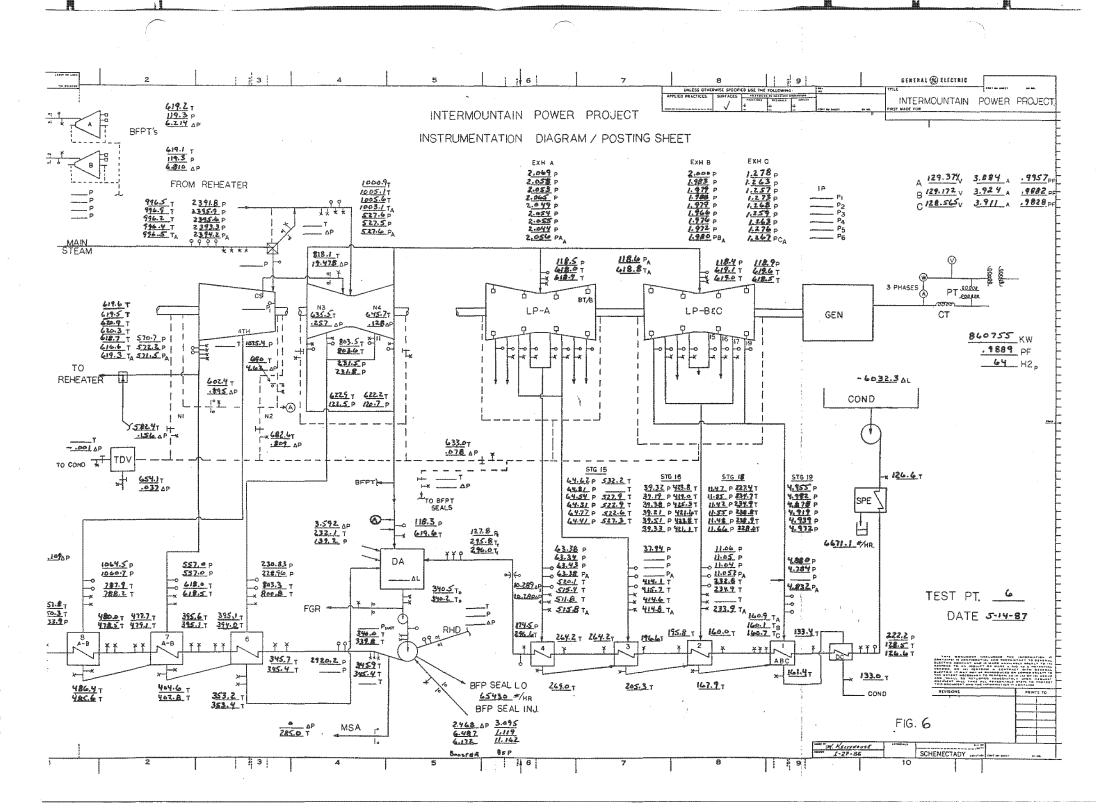
INTERMOUNTAIN POWER PROJECT

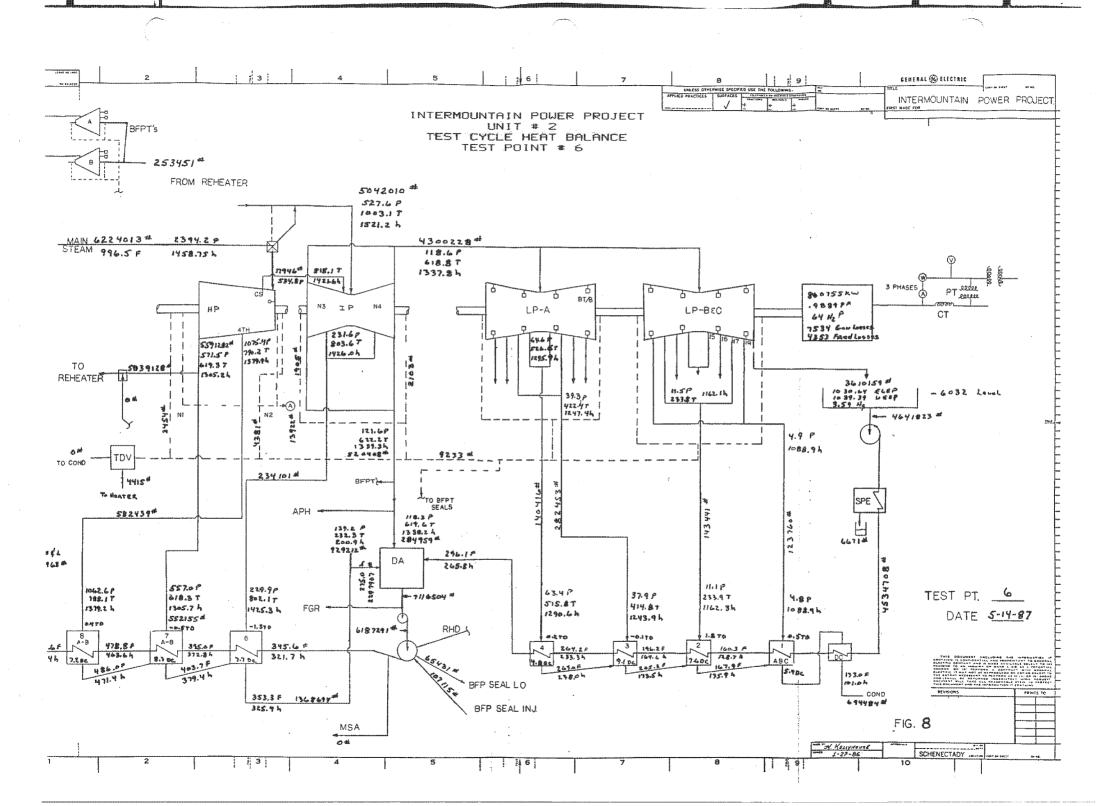
3

FROM REHEATER

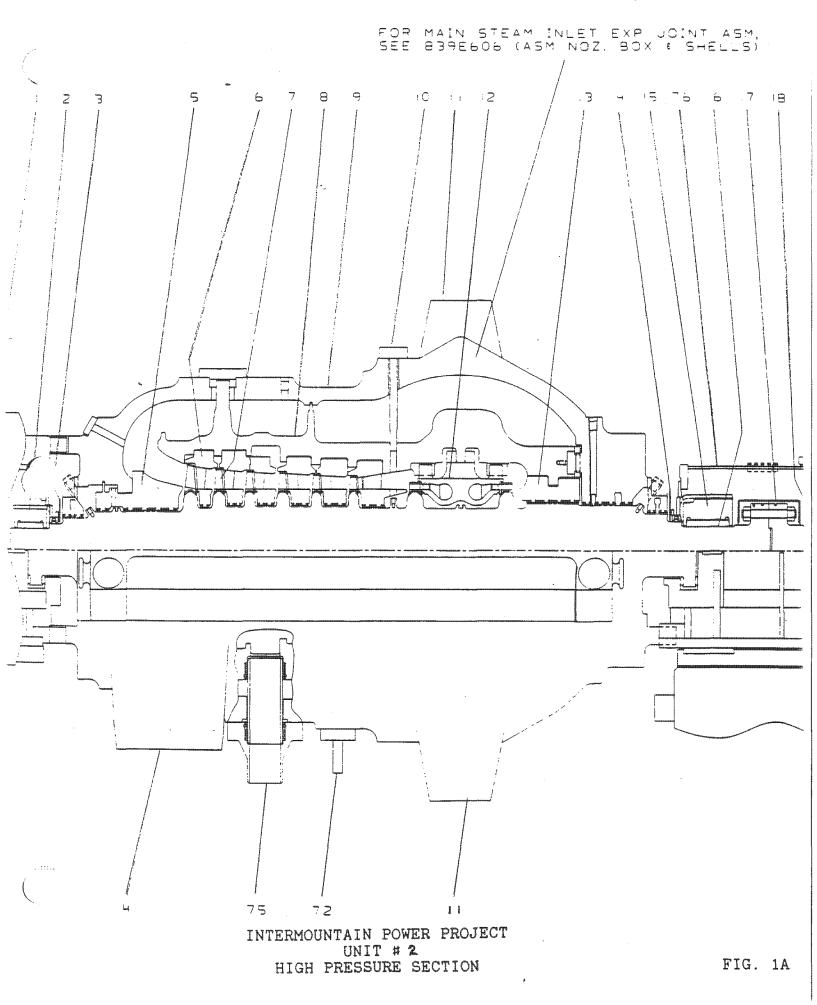
P14\_004902

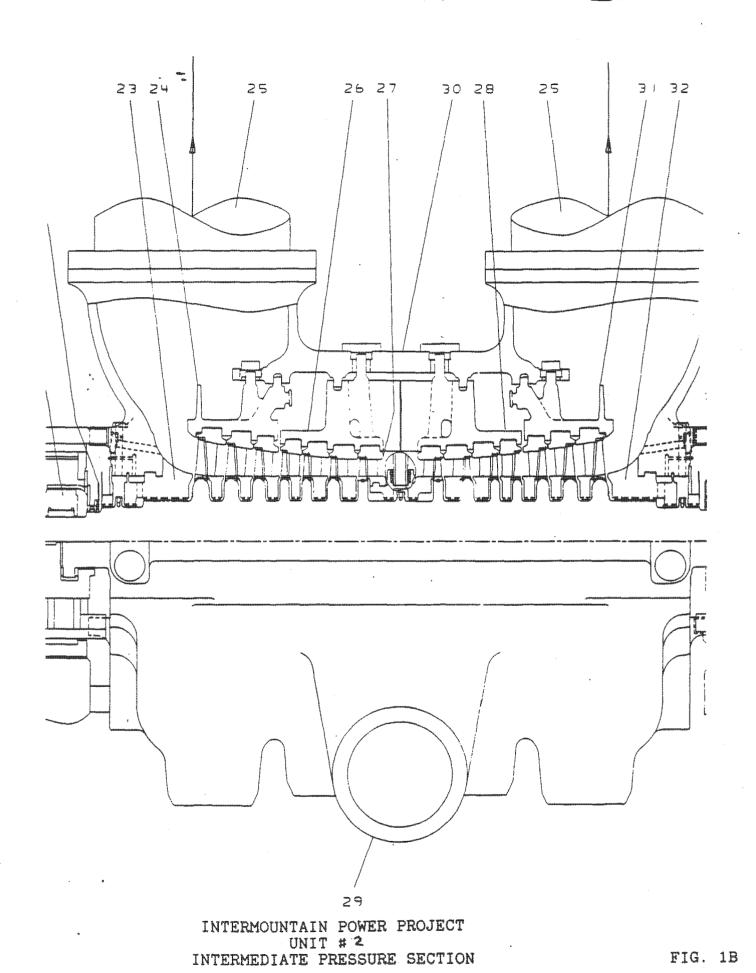




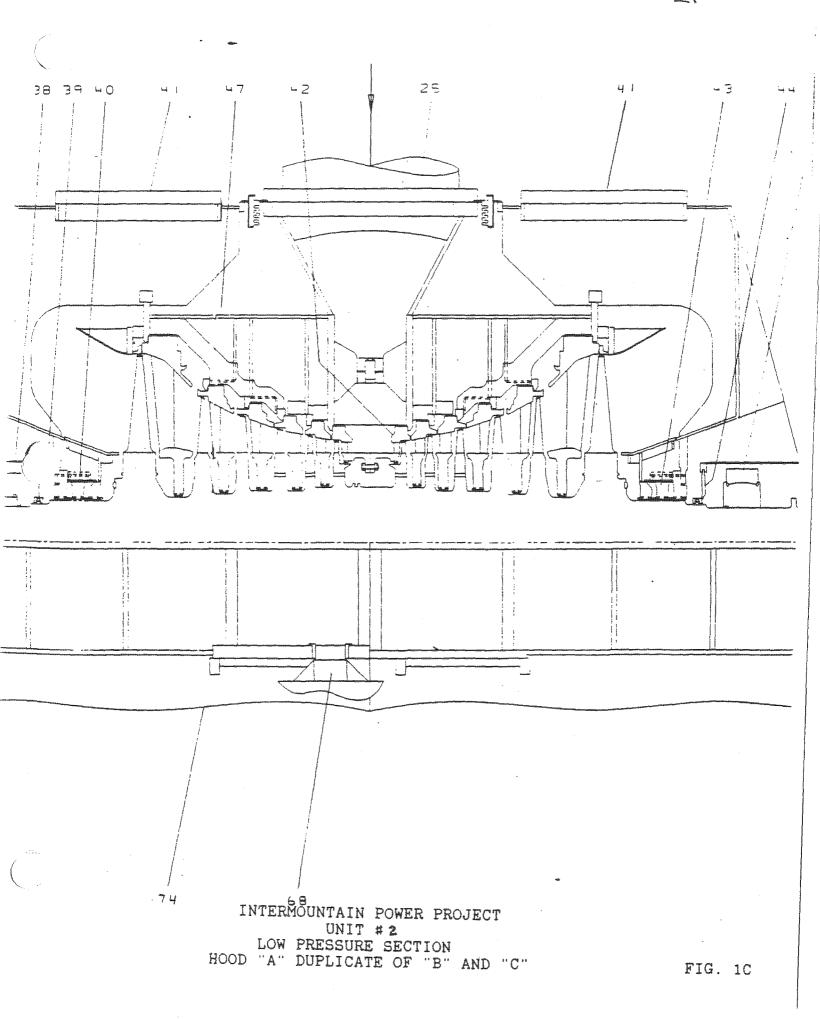


HP





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1013-8 (1-10) 4010 OFFSET-TOS

# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

### APPENDIX B

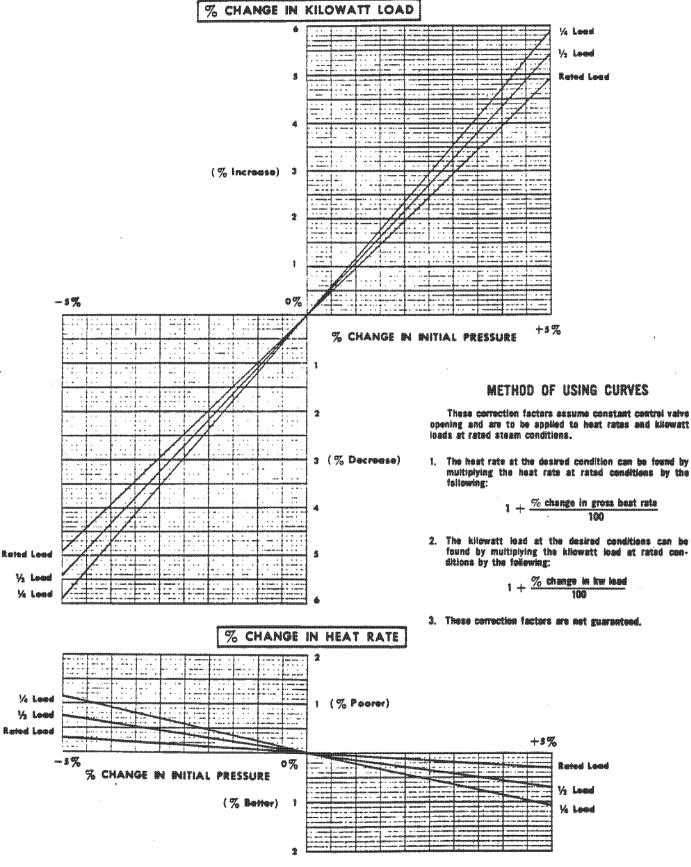
### **Correction Curves**

Dwg. No.	Nomenclature	Page
GEZ 3614	Throttle Pressure Correction	B1
GEZ 3615	Throttle Temperature Correction	B2
GEZ 3617	Reheat Temperature Correction	<b>B3</b> .
481 HP 475	Exhaust Pressure Correction	B4
	Rehant Press Drap?	

Page No. B1
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### INITIAL PRESSURE CORRECTION FACTORS

### FOR SINGLE REHEAT UNITS



GEZ-3614

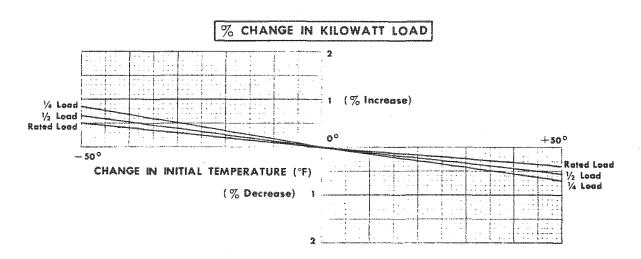
4-81 (2M)

GENERAL ELECTRIC

FIG. BI

### INITIAL TEMPERATURE CORRECTION FACTORS

### FOR SINGLE REHEAT - SUBCRITICAL PRESSURE UNITS



### METHOD OF USING CURVES

These correction factors assume constant control valve opening and are to be applied to heat rates and kilowatt loads at rated steam conditions.

 The heat rate at the desired condition can be found by multiplying the heat rate at rated conditions by the following:

$$1 + \frac{\% \text{ change in gross heat rate}}{100}$$

2. The kilowatt load at the desired conditions can be found by multiplying the kilowatt load at rated conditions by the following:

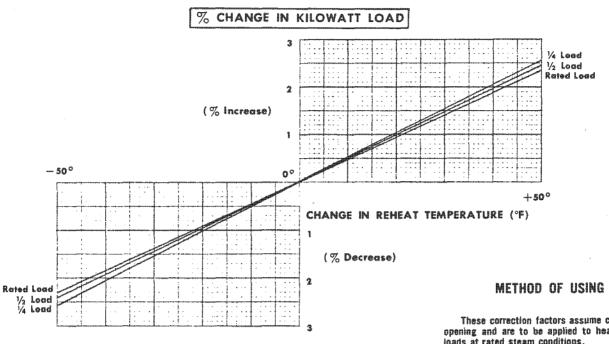
3. These correction factors are not guaranteed.

# Raied Load 1 (% Poorer) -50° CHANGE IN HEAT RATE 1 (% Poorer) +50° CHANGE IN INITIAL TEMPERATURE (°F) (% Better) 1 2

GENERAL ELECTRIC FIG. BZ

## REHEAT TEMPERATURE CORRECTION FACTORS

### FOR SINGLE REHEAT UNITS



METHOD OF USING CURVES

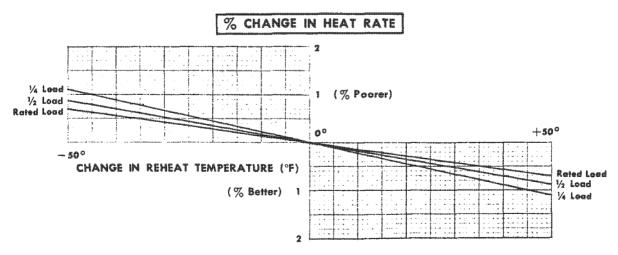
These correction factors assume constant control valve opening and are to be applied to heat rates and kilowatt loads at rated steam conditions.

1. The heat rate at the desired condition can be found by multiplying the heat rate at rated conditions by the following:

The kilowatt load at the desired conditions can be found by multiplying the kilowatt load at rated con-ditions by the following:

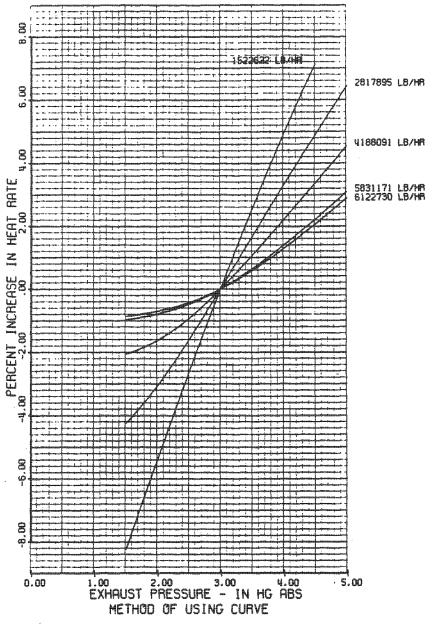
$$1 + \frac{\% \text{ change in kw load}}{100}$$

3. These correction factors are not guaranteed.





820000 KW AT 1.66/ 2.24/ 2.99 IN HG ABS 1.00 PCT MU TC6F-30.0 IN LSB 3600 RPM 2400 PSIA 1000/1000 T



VALUES NEAR CURVES ARE FLOWS AT 2400 PSIA 1000 T
THESE CORRECTION FACTORS ASSUME CONSTANT CONTROL VALVE OPENING
APPLY CORRECTIONS TO HEAT RATE AND KW LOADS
AT 2.99/ 2.24/ 1.66 IN HG ABS AND 0.0 PCT MU.

THE PERCENT CHANGE IN KW LORD FOR VARIOUS EXHAUST PRESSURES IS EQUAL TO (MINUS PCT INCREASE IN HEAT RATE) 100/(100 + PCT INCREASE IN HEAT RATE)

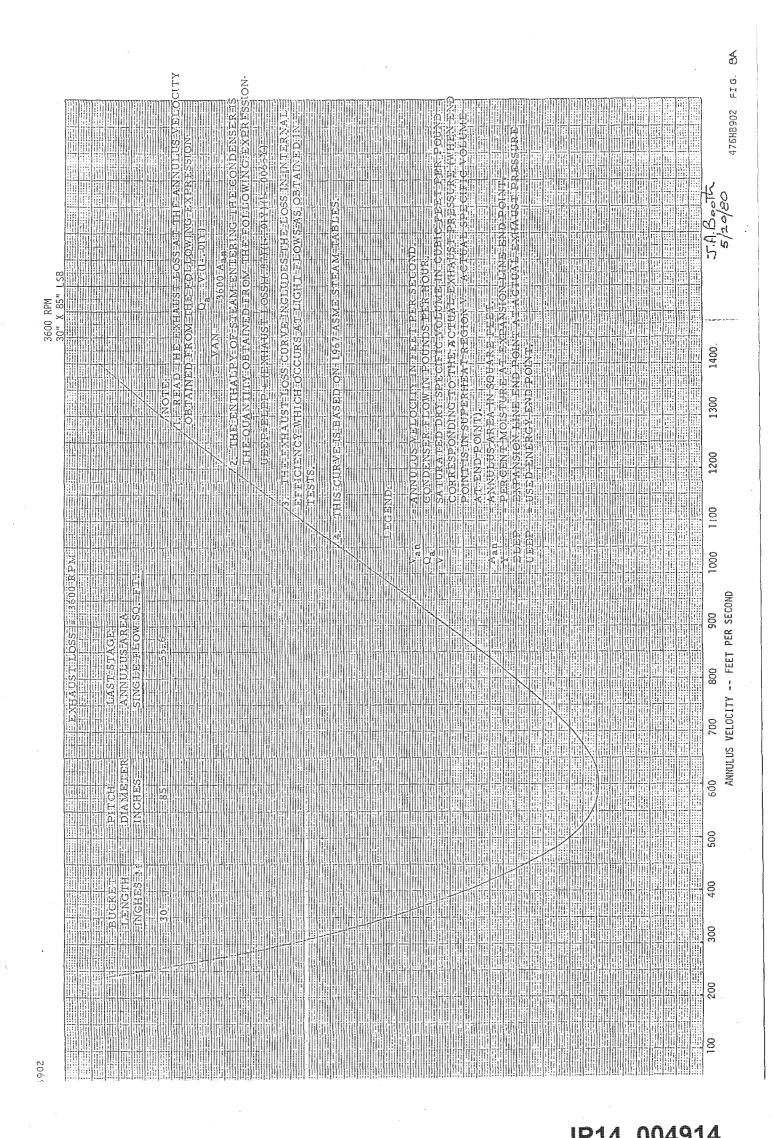
THESE CORRECTION FACTORS ARE NOT GUARANTEED

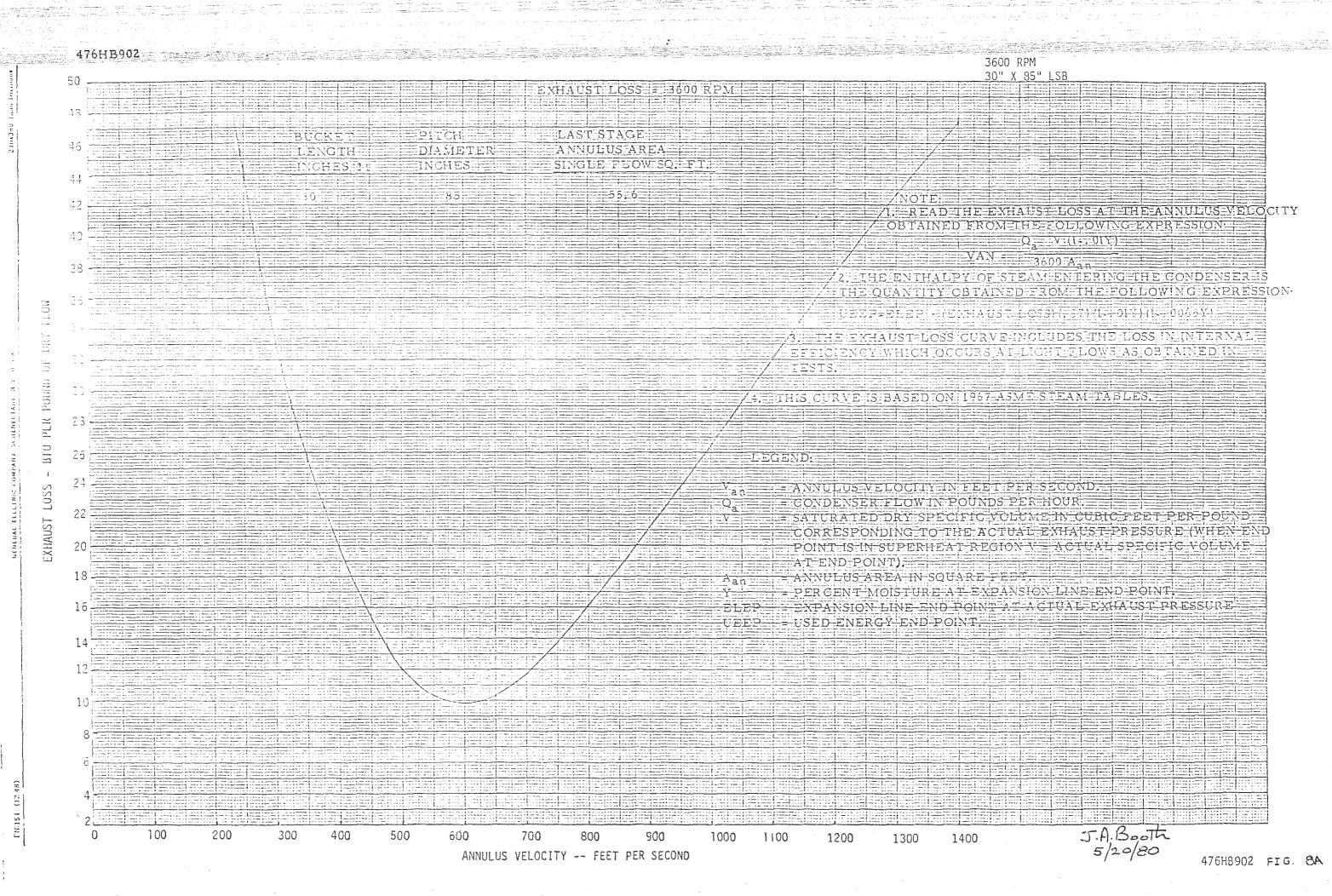
HB 475

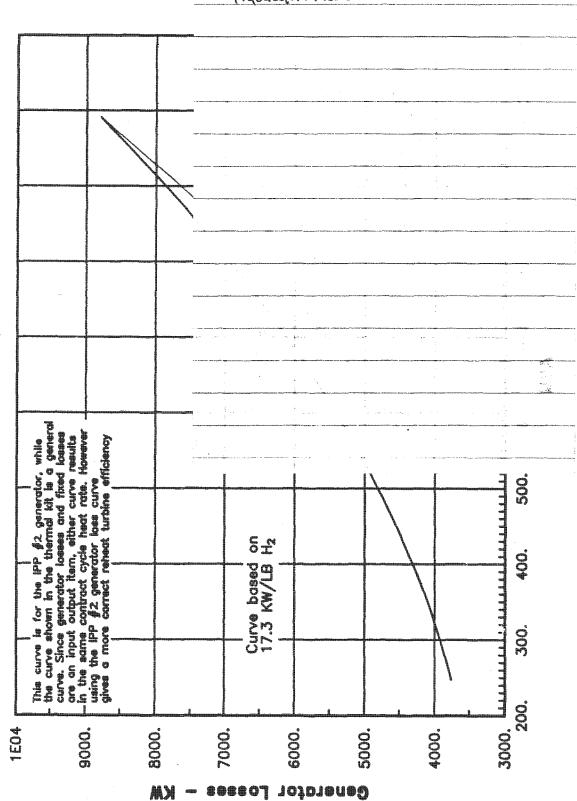
PRESSURES ALONG ABSCISSA ARE PRESSURES IN HOOD C

PRESSURE(IN HG A	ABS) FOR	HOOD C 1.50 2.00 2.50 3.00 3.50 4.00	HOOD B 1.09 1.47 1.85 2.24 2.63 3.03	HOOD A .78 1.07 1.36 1.66 1.96 2.27
		4.50 5.00	3.42 3 82	2.58

F16. B4







INTERMOUNTAIN POWER CO.

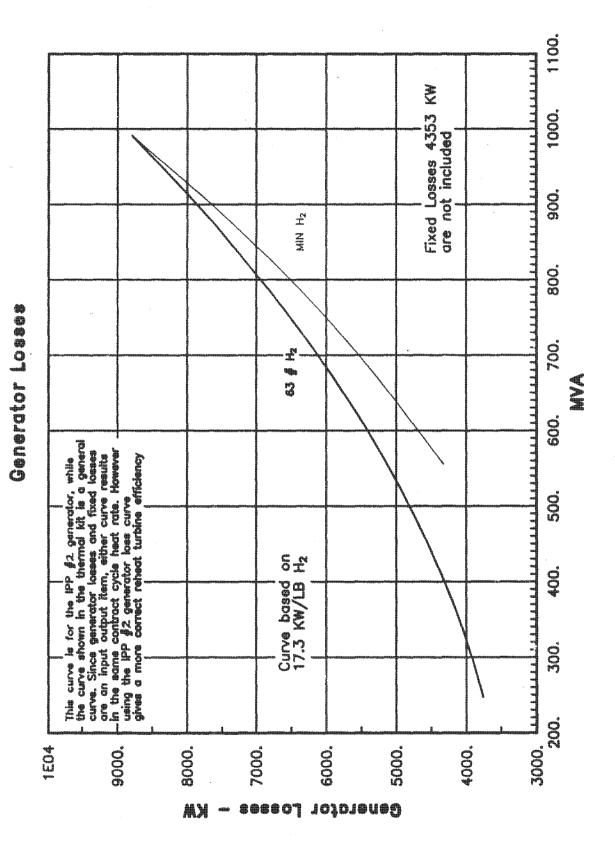
Generator Losses

P No. 2

Fvg. 7

# INTERMOUNTAIN POWER CO.

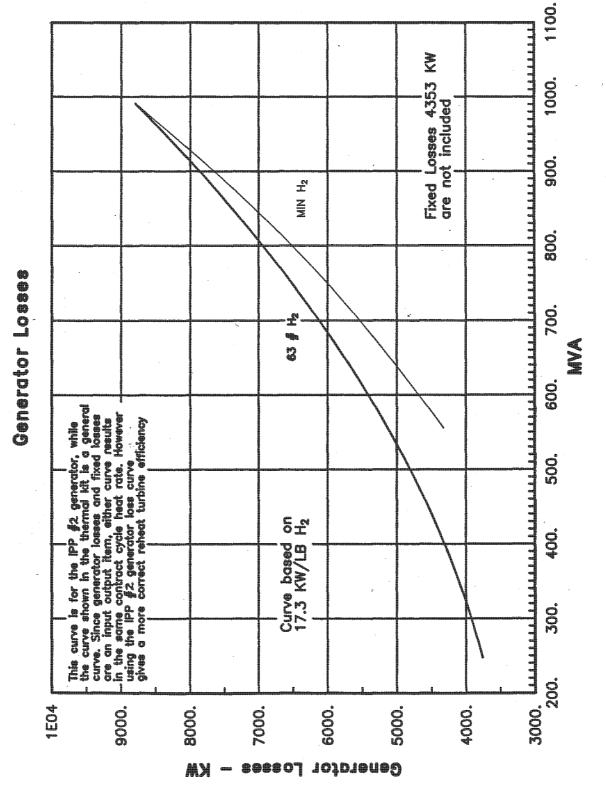
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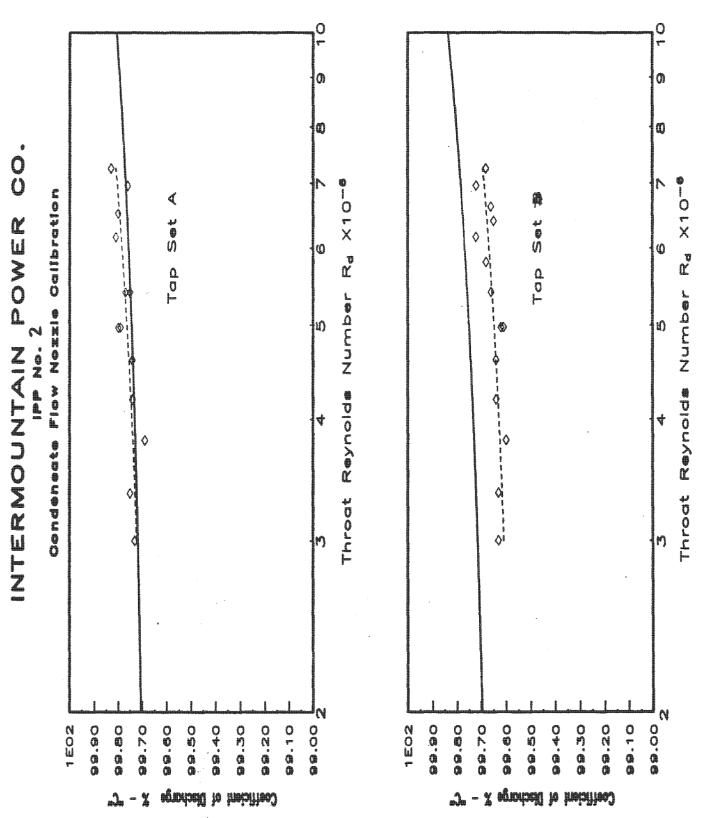
Fvg. 7

# INTERMOUNTAIN POWER CO.

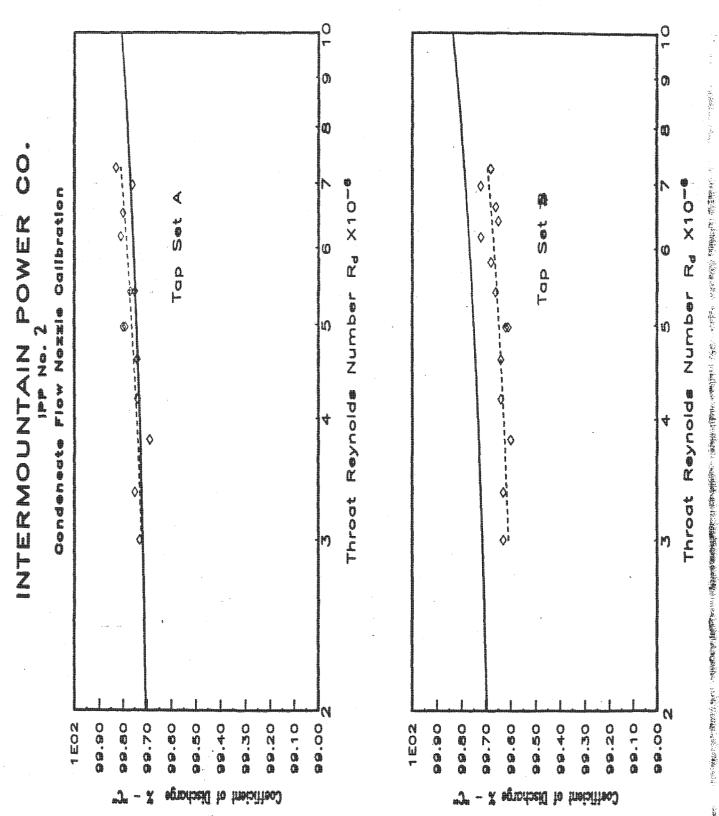
PP No. 2



F14. 7



F16.3



F16.3

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013-8 (7-70) ----TO OFFSET-TOS

# TECHNICAL INFORMATION SERIES NO. DF87STG05

### APPENDIX D

### **Enthalpy Drop Efficiency**

	Page <u>No.</u>
Summary of Data and Results of the IPP #1 Startup Enthalpy Drop Test	D1
Correction Curves for HP Efficiency	D2
General Description of Enthalpy Drop Efficiency Test	D3

Page No. D1
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# INTERMOUNTAIN POWER PROJECT UNIT # Z Enthalpy Drop Startup Test Data

TEST FT.		1	2	3
VALVE PT.		2nd	3rd	VWO
THROTTLE P	(psia)	1495.37	1212.0	1216.05
THROTTLE T	(deg F)	1004.29	1003.82	1003.35
CRH P	(psia)	283.70	293.41	324.00
CRH T	(deg F)	609.43	643.84	657.15
VC F	(psia)	1481.18	1197.10	1205.95
ist STG P	(psia)	818.18	895.83	996.95
P1/PT		. 5471	.7390	. 8198
HF (effy.)		81.835	87.10	88.71
T (corr.)		+.035	+.033	+.030
F (corr.)		-,24	16	16
HTR (corr.	)	+.80	+.60	+.60
HP (effy)	corrd.	82.43	87.573	89.18
HRH P	(psia)	262.3	269.24	297.38
HRH T	(deg F)	972.78	995.14	996.94
LPB P	(psia)	59.926	59.860	66.269
LPB T	(deg F)	599.44	612.72	614.82
IP (effy.)		91.569	91.74	91.613
HTR (corr.	<b>)</b> **	+.40	+,40	+.40
IP (effy)	corrd.	91.969	92.14	92.013
HTR (Out S	erv.)	6AB,7AB,8AB	6B,7B,8AB	4B,7B,8AB
Barometric	Pres. (Psia)	12.54	12.5	12.48
** Data fr	om Unit # 1 sho	wed a change in	performance leve	1 of 0.40%

points with # 6 heater in service.

Fig. DI

### ENTHALPY DROP EFFICIENCY TEST

A turbine section efficiency can be measured if superheated steam conditions exist at both the inlet and exhaust of the section and the steam is thoroughly mixed so that the average temperature can be measured. The efficiency is defined as the energy used divided by the isentropic energy that is available. See Figure 1.

It is customary practice to measure the efficiencies of the high pressure turbine and intermediate pressure turbine of fossil fired reheat turbines with this method.

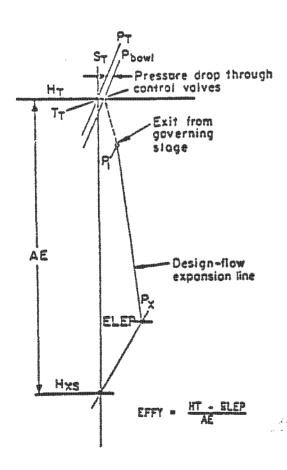


Fig. 1-a., Construction of expansion lines for non-condensing turbines with governing stage (HP TB)

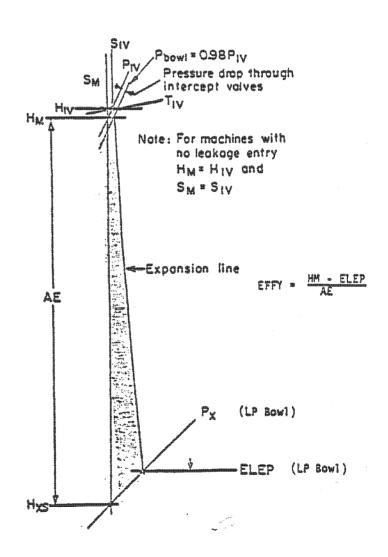


Fig. 1-b. Communication or expansion lines for IP turbines

To obtain an acceptable degree of accuracy and precision, the tests must be run by holding steam temperatures, pressures, and flows constant. Fluctuations of steam pressure should not exceed one percent of absolute pressure; temperature fluctuations should not exceed 5 F. Steam flows and load can be held constant by proper operation of the control mechanism. Care must be taken to insure that the turbine is up to operating temperature. After attaining steady conditions for at least half an hour, a test of one-hour duration with temperatures and pressures read at five-minute intervals should give satisfactory results.

The probable error of these section efficiencies is about 0.25 percent. This accuracy is based upon the ability to measure pressure within 0.1 percent at the throttle and reheat points, and 0.1 psi at the intermediate-pressure-section exhaust, and temperatures within 1/2 F. This probable error has been verified by comparing measured flow with calculated flow using enthalpy-drop efficiencies on the high-pressure section of cross-compound units.

Pressures above 35 psia should be measured with piston-type, dead-weight gages using calibrated weights. For a lower pressure a transducer may be used.

The design of a pressure tap should conform with the ASME Power Test Codes. Taps should be in a straight run of pipe, or at least not in or immediately adjacent to, a sharp turn, and should consist of a flush hole in the pipe wall. Care should be taken to remove any burrs.

The pressure connections should be located ahead of the turbine emergency stop valve, ahead of the intercept valve, in a cold reheat pipe near the high-pressure-section exhaust connection, and in the low-pressure-section bowl. If the intercept valve is directly connected to a reheat stop valve, then the pressure connection should be immediately ahead of the reheat stop valve. Figure locates these points of pressure measurements.

The pressure connection may be on the top, bottom, or side of a steam pipe provided certain precautions are taken to insure a definite water leg. If the connection is from the top or side of the steam pipe, the pressure-gage piping should be run horizontally and then dropped down. The same rule holds when the pressure gage is to be located above the pressure connection, i.e., there should be a downward loop in the gage line right near the pressure

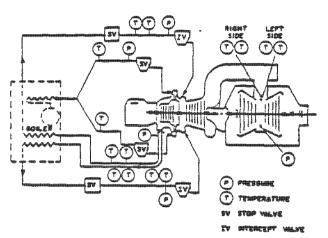


Fig. 2 Schematic arrangement of pressure and temperature instrument locations

connection. Pigtails are acceptable. These arrangements are shown in Fig. 3.

The pressure connection in the low-pressuresection bowl is located in the bottom of the bowl and is a 1/2-inch pipe, plugged at the end, and has several 1/4-inch diameter holes drilled through near the end of the pipe, Fig. 4.

For cross-compound turbines the intermediatepressure-section exhaust pressure tap should be in the crossover pipe immediately downstream of the exhaust connection.

Temperatures should be measured with precision resistance thermometers or calibrated thermocomples and read on precision bridges and potentiometers.

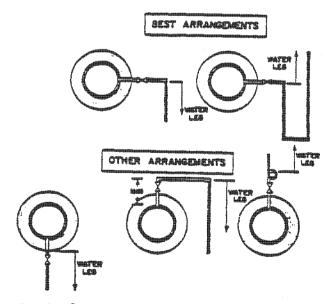


Fig. 3. Pressure-gage connections to steam pipes

+High accuracy transducers may be substituted if calibrated before and after the test.

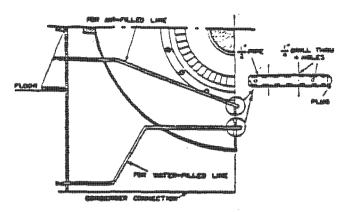


Fig. 4 Section through low-pressure turbine bowl showing pressure tap installation

If is recommended to duplicate temperature instrumentation. This will not only improve the accuracy of the data but will also detect a faulty temperature measurement. Placing the two thermowells in the top of a horizontal pipe so they are at about a 45-degree radial angle on each side of the vertical center line is a good scheme. The object is not to have two thermowells in line. Fig. 5.

When there are two separate steam leads from the boiler to the turbine, duplicate instrumentation in each lead is recommended, Fig. 2.

The length of the thermocouple well from the inner wall of pipe extending into the stream deserves attention in order to eliminate the error due to heat conduction up the thermocouple well wall. At the throttle the immersion should be? 2"and almost all standard installations are satisfactory. At the hot reheat point it is recommended that the immersion should be at least four inches if the outside diameter of the well is not greater than 1 1/2 inches. At the cold reheat point the immersion should be six inches. The location of the thermowells in the cold reheat line should be some distance downstream from the turbine and after at least one elbow to provide the proper mixing. The maximum distance from the turbine should not exceed 50 feet.

The thermocoupie wells in the low-pressuresection bowl are made up of four 1/4-inch pipes which are securely fastened in the steam path. These probes should have radiation shields on their ends because the temperatures of all the wall surfaces in the bowl may be somewhat lower than the

bowi steam temperature. A typical installation is shown in Fig. 6.

For cross-compound turbines, two thermocouple wells should be in each crossover pipe located near the downstream end of the pipe. The immersion should be at least six inches if the outside diameter of the well is no greater than 1 1/2 inches.

Sample calculations of high-pressure and intermediate-pressure-section efficiencies are given in Table 1.

### TABLE 1 SECTION EFFICIENCIES

### High-pressure Section Efficiency

 $P_1 = 1815 psia$ 

 $P_2 = 430 psia$ 

 $T_1 = 1000 F$ 

 $H_1 = 1480.3 Bta/lb$ 

T<sub>2</sub> = 638.8 F H<sub>2</sub> = 1326.8 Btu/lb

Entropy = 1.5739 Btu/lb F

Isentropic

end point = 1298.4 Btu/lb

1480.3 - 1326.8 1480.3 - 1298.4 x 100 = 84.4 percent Efficiency =

### Intermediate-pressure Section Efficiency

 $P_1 = 402.0 \text{ psia}$ 

 $P_2 = 44.0 \text{ psia}$ 

 $T_1^* = 1000 \text{ F}$   $H_1^* = 1522.4 \text{ Btu/lb}$ 

 $T_2 = 470.0 F$ 

Reheat

Bowl

\*710,290 x 1522.4 + 21,300 x 1450.8 = 1520.3 Btu/lb 731,590

Flows estimated from design heat balances

Entropy P1 and Hmix = 1.7600 Btu/lb F Isentropic end point = 1244.9 Btu/lb

Efficiency =  $\frac{1520.3 - 1270.0}{1520.3 - 1244.9} \times 100 = 90.9$  percent

<sup>\*</sup>or for tandem compound units with external pipes. In the near future all GE provisions will be in the crossover pipes.

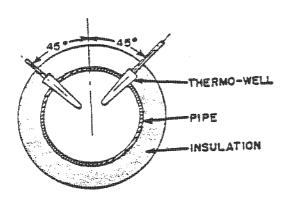


Fig. 5 Typical thermocouple-well arrangement

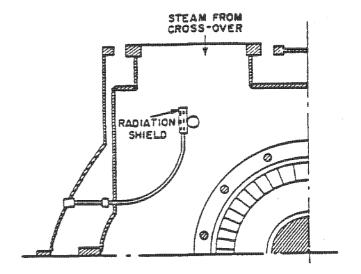
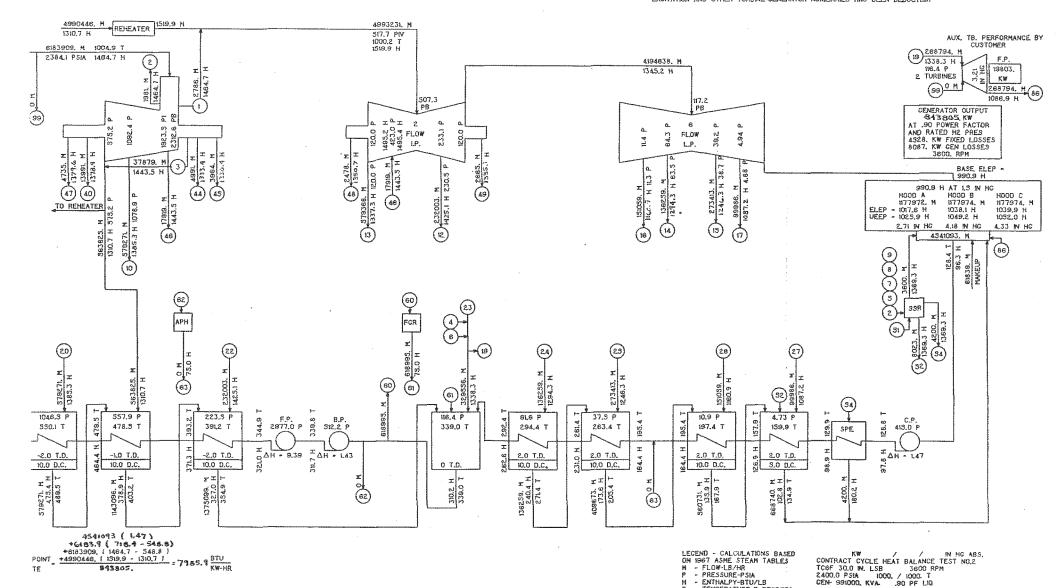


Fig. 6 Section through low-pressure turbine bowl showing thermocouple-well installation

### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

### CALCULATED DATA - NOT CUARANTEED

RATING FLOW IS 3979039. M AT INLET STEAH CONDITIONS OF 24/2,2 PS/A AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC, WHICH MY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS 3.0 PERCENT) OF 6278012, M
THE EQUIVALENT DESIGN FLOW AT 2384,1 PS/A AND 1004.9 T IS 6183893, M
THE VALUE OF CEMERATOR QUIPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



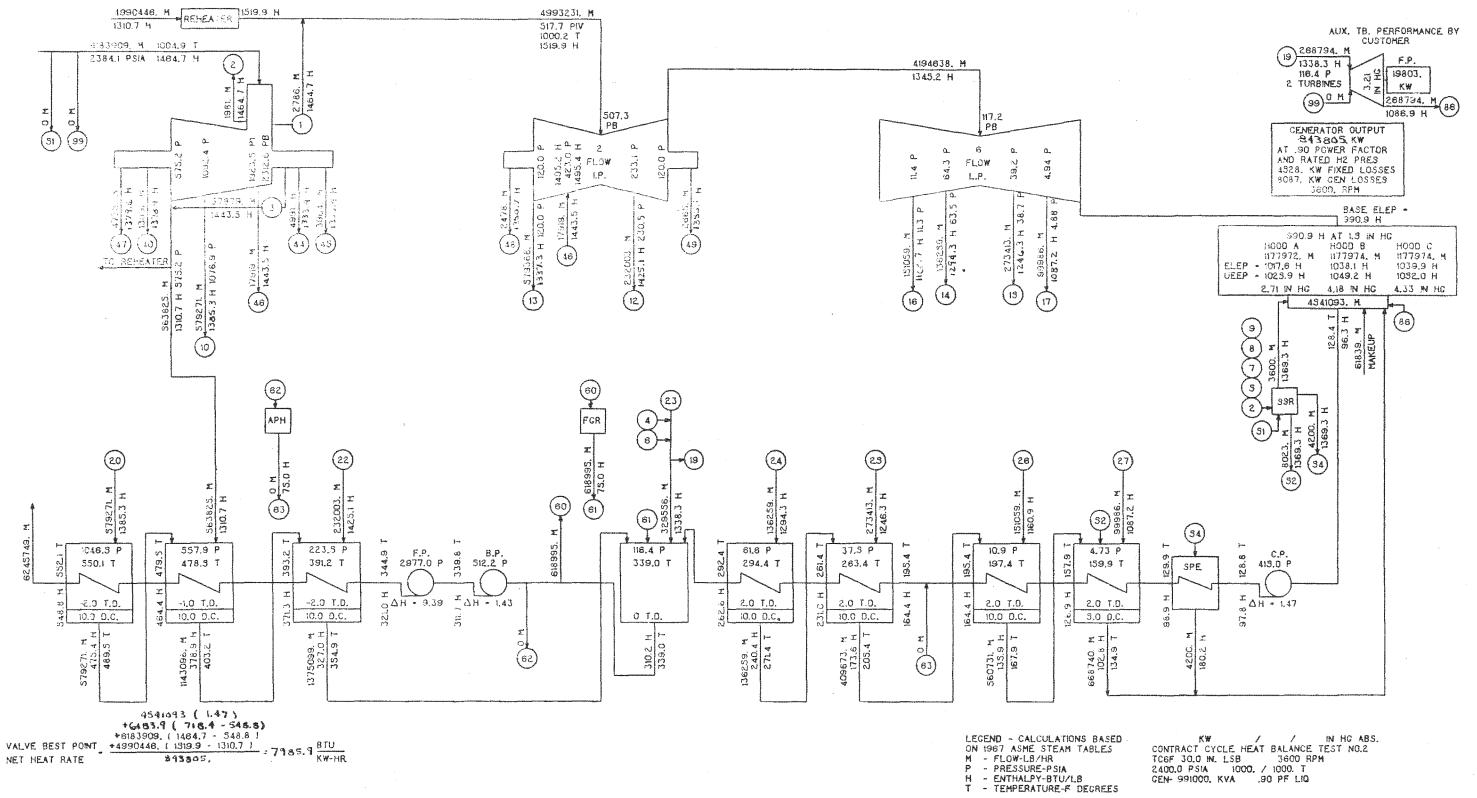
CONTRACT CYCLE HEAT BALANCE TEST No. 2

- ENTHALPY-BTU/LB - TEMPERATURE-F DECREES

99487 1 0 1

### CALCULATED DATA - NOT GUARANTEED

RATING FLOW IS 5979059. M AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES. SHOP TOLERANCES ON DRAWING AREAS. ETC. WHICH MAY AFFECT THE FLOW. THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS 3.0 PERCENT) OF 8278012. M
THE EQUIVALENT DESIGN FLOW AT 2334.1 PSIA AND 1004.9 T IS 6183893. M,
THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR
EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



CONTRACT CYCLE HEAT BALANCE TEST No. 2

GENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

9948T 1 0 1

FIG. 9A

### TEST CYCLE HEAT BALANCE

 VALVE POINT
 VWO
 05/11/87
 TEST POINT
 02

 INTERMOUNTAIN PWR PROJECT
 UNIT #2

 820000. KW
 TC6F-30
 IN LSB
 TURBINE NO
 270T151

 2400. FSIG
 1000./ 1000. F
 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

 TOTAL LOAD
 855960.
 855119.

 HEAT RATE
 7855.9
 7863.6

 THROTTLE FLOW
 6183909.
 4285838.

### TURBINE THERMAL PERFORMANCE

HIGH PRESS TB			REHEAT TB			
			IP TB		LP TB	
	THROTTLE	COLD RHT	INLET	EXH	EXH	
PRESS	2384.10	566.00	521.40	118.50	3.739	
TEMP	1004.90	625.10	999.59	617.20	122.95	
ENTH	1464.67	1309.24	1519.47	1336.96	1032.15	
ENTR	1.5364		1.7320	1.7471		
for five fine	87.	. 952	91.926		94.023	
ABSCISSA	PHPX/PT=0.2	374	P1STSTG/PT=0.80	45 V	'AN= 518.0	

### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY RHT TB	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	518.30	326.99		
H ELEP	1032.15		1032.15	
H UEEP	1040.68		1040.68	
EFF ELEP	94.02	93,22	94.02	93.22
EFF UEEP	92.38	90.61	92.38	90.61
VAN	518.03		518.03	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A02-1

	TOTAL TB ENER	RGY BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LF TB
H ELEF	1034.72		1034.72	
H UEEF	1043.26		1043.26	
EFF ELEF	93.53	92.43	93.53	92.43
EFF UEEF	91.88	89.82	91.88	87.82
UAN	519 45		519.45	

### STAGE FLOW FUNCTION

STS NC		ONE VEL HD	PCT DELTA	FLANG P PRESS		O/AP H FLG	QFS	· Q/AP H SHL
1 4 RH 1 8 11 15 15 16 18	1918.00 1086.39 521.40 510.97 233.00 118.50 45.19 39.70 11.64 5.01	0. 4.282 0. 0. 0.811 0. 0.287 0.189 0.057	0. 1.24 0. 0. 1.11 0. 1.28 1.38 1.43	0. 1072.90 0. 0. 230.40 0. 64.36 39.15 11.48 4.95	86.6 157.4 350.2 350.2 711.2 807.6 1414.8 2021.4 6018.0	0. 848.4 0. 0. 790.7 0. 1086.5 1101.9 1079.4	6123308. 5525420. 5012929. 5030848. 4798678. 4277024. 4137685. 3856782. 3715227. 3594785.	1007.1 843.1 799.9 819.0 780.3 1122.2 1059.4 1076.4 1042.3 1112.1

		F E E D W	ATER	CYCLE			
					g g general	V cales have been	<b>~</b>
п	r	~~~~	A70 50	467 00	6161067.4	ATER	8
		2728.40 1062.50		4 <b>6</b> 3.22 1383.93	579451.5		-0.1
		1062.50	485.80	471,18	579451.5		7.3
Year	DRAIN	1082.50	460.60	471"10	3/7431.3	DC =	/ * · ·
					HE	ATER	7
7	FW IN	2728.40	394.50	372.31	6161067.4		
	EXTR	553.10	624.30		4000 at an area o tout	4000 0400	-1.0
	DRAIN	553.10	403.30	379.00	544362.4	DC =	8.8
		1062.50	485.80	471.18	579451.5		
**							
						ATER	6
		2824.00			6161067.4		
	EXTR	228.70		1424.20	232170.1	TD =	-1.3
		228.70	352.80		1355984.0	DC =	7.7
Ó	ENTRY	553.10	403.30	379.00	1123813.8		
					_	UMF	
11	FW IN	0.	0.	٥.	6147184.2		
	SEAL INJ	Ő.	ŏ.	ŏ.	110957.1		
	SEAL RET	O.	o.	0.	65681.0		
	LEAKAGE	o.	ŏ.	o.	0.		
				171.47	o.		
	FW OUT		345.10		6192460.3	<i>2</i>	
,566, 9694,	1 V 5 500 500 5	about hand above house 200 "m" "gg"	Jours B Strong 800 offer "We.	`one' effect plie ∰ 'mp' affe	beer she Y about 1 boar 'es' B 'eas'		
					HE	ATER	5
13	FW IN	127.30	295.80	265.51	4513807.5	OPEN	
12	EXTR	118.30	617.90	1337.32	278489.7	STO =	797.0
111	DRAIN	118.30	340.10	311.36	7143589.9	SC =	0.1
109	ENTRY	0.	0.	278.04	2352389.8		
					1 2 pm	pri, cegos gotos gam.	
,,	···· · · · · · · · · · · · · · · · · ·	"I and aids had "as"	9/4 00	band under micht. "If "on"		ATER	4
	FW IN				4513807.8		~ 4
	EXTR	63.26	514.70		139338.8		0.4
īΟ	DRAIN	63.26	268.60	237.57	139338.8	DC =	4.6
					HE	ATER	3
20	FW IN	173.80	196.10	164.54	4513807.8		_
	EXTR	38.23	413.70	1243.33	280903.0		0.5
	DRAIN	38.23	205.20	173.37	420241.8		9.1
	ENTRY	63.26	268.60	237.57	139338.8		- 11 14
	•						
•					H	ATER	2
23	FW IN	173.80	160.50	128.86	4513807.8	CLOSED	
200 4	lam 4% who keep	and the second	hand mide made. Since had	44700 000	4 / 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	TT\	at Jenny

21 EXTR

22 DRAIN

19 ENTRY

11.04

11.04

38.23

233.50

167.90

205.20

1162.08

135.88

173.37

1.8

7.4

141555.3 TD =

DC =

561797.2

420241.8

T	··-		PRESS	TEMP	ENTH	FLOW	
	TDV TDV		5.11 2.21	660.40	1365.02 1274.35	4149.8 4149.8 0.	
25 123 22	EXTR DRAIN		4.86 4.86 11.04	0. 134.20 167.90	1087.61 102.16 135.88	4513807.8	TD = 0.6
33 87 27	LEAKA(	3E	o. o. o.	0.	O.	Fl 4624764.8 O. 4624764.8	
						loos f	N TO BOILER
-1	FW IN		2728.40	552.10	549.07	6161067.4	S+L = -8551.
			T	URBIN	EEXPA	NSION	
						MA O. 6183909.3	AIN STEAM LINE
						V	ALVE STEM LKG
37	LO NO	1	521.60	897.90	1464.67		P/V = 85.583 C = 55.714
38	LO NO	2	٥.	٥.	0.		P/V = 18.640 C = 107.081
						. EX 6123307.6 55833.4	KP TO STG 1
						PACH	(ING NO 2
42	LO NO	1	123.17	700,00	1378.36		P/V =.115E 19 C = 0.000
43	LO NO	2	17.14	690.50	1379.04		F/V = 4.718 C = 1030.390
100	LO NO	inger Ve Vend	٥.	٥.	0.		P/V = 0.655 C = 1769.447

TL	PRESS	TEMF	ENTH	FLOW
41 SHELL 79 EXTR		o. 797.80		EXP TO STG 4 5525420.4 579451.5
				PACKING NO 1
46 LO NO	1 121.87	609.30	1332.80	SQRT P/V = 23.281 4789.9 C = 378.653
47 LO NO	2 17.02	589.20	1329.88	SQRT F/V = 4.874 3438.1 C = 825.981
100 LO NO	3 O.	0.	0.	50RT P/V = 0.682 587.4 C = 1769.447
49 EXH 80 EXTR 50 TO RHT	566.00	625.10 625.10 625.10	1309.24 1309.24 1309.24	544362.4
BEFORE L	0.08	O.,	1519.83	REĤEATER 1 O.
37 ENTRY 84 AFTER L	0 521.40	1000.20	1519.80	5012929.1 PCTDP = 7.880
51 ENTRY 125 ENTRY	510.97 529.52	999.02 827.00	1519.47 1426.65	EXPAND TO BOWL 5030848.4 17919.2
				EXP TO STG 11 4798678.3 232170.1
				PACKING NO 3
57 LO NO	1 16.99	634.30	1351.68	SQRT P/V = 4.719 1919.2 C = 1102.299
59 LO NO	2 17.00	643.40	1356.09	SQRT $P/V = 0.666$ 2108.0 $C = 4926.706$
100 LO NO	3 0.	0.	0.	SQRT P/V = $0.664$ 587.4 C = $1769.447$
100 LO NO	4 0.	0.	Ο.,	SQRT P/V = 0. $587.4 C = 1769.447$

TL.	PRESS	TEMP	ENTH	FLOW	
56 EXH 55 EXTR			1336.96 1338.28		EXHAUST
59 ENTRY	118.50	617.20	1336.96	EXPAND 1	TO BOWL
61 SHELL 60 EXTR			1277.73 1295.23	4137685.2	STG 15
			1233.19 1246.91		3TG 16
65 SHELL 64 EXTR			1141.41 1161.88		STG 18
107 SHELL 106 EXTR	5.01 4.95	o. o.		EXP TO 8 3594784.7 120442.1	STG 19
TL	PRESS	TEMP	ENTH	FLOW	
108 TB EXH 76 ENTRY 122 DRAIN	1.84 o. o.	122.95 0. 0.	1040.6816 O. O.	CONDENSE SHAFT 3594784.7 LEVL = 1020332.7 4624765.4	. 1 -9648.0
				SHAFT	1
MEASURED LOA SHAFT 1 KW	AD = 85590 J = 867810		$PF = 0.98^{\circ}$ FL = 4353.0	7   H2 = 64.00 $6L = 7503.4$	

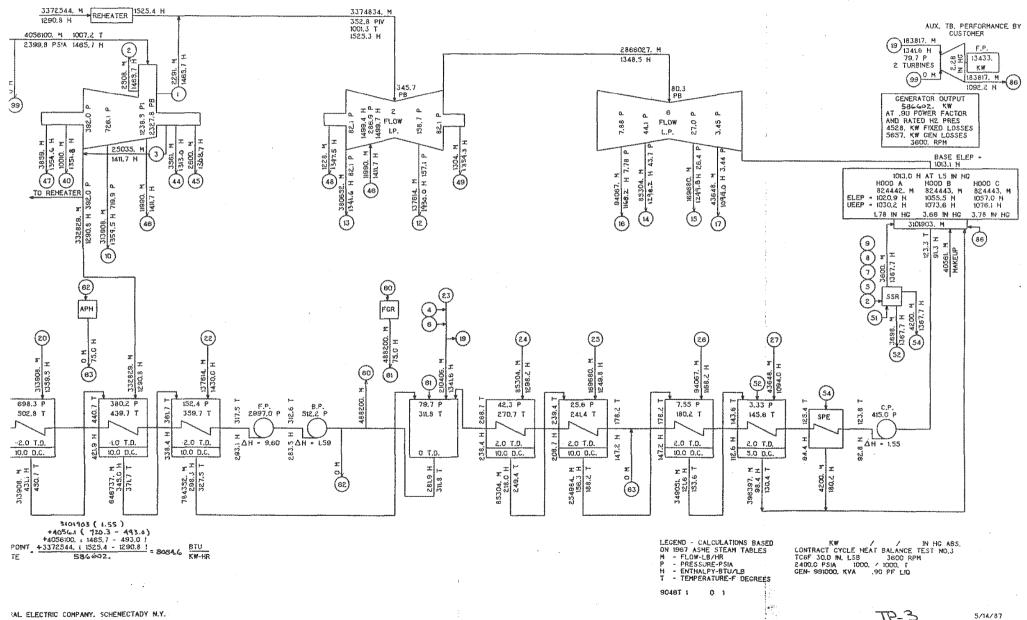
## F E R F O R M A N C E

### TRUNKLINE OUTPUT

TI.	E	<b>T</b>	Н	Q	SV	SF	FV	TR
1	2728.4	552.1	549.1	6161067.	5V 0.0213	0.	O .	-8551.0
	1062.5	795.7	1383.9	579451.	0.6399	551.990	-0 110	243 7
.3	. 1062.5	485.8	471.2	579451.	0.0200	o. o.	7.300	O
4	2728.4	478.5	463.2	6161067.	0.	O.	0.	٥.
5	555.1			544362.	1.0701	477.533	o. -o.967	146.8
ద	553.1	403.3	379.0	1123814.	0.0186	0.	8.800	0.
7	2728.4	394.5	372.3	6161067.	0.	0.	8.800 0. -1.292	0.
8	228.7	799.8	1424.2	232170.	3.2200	393.208	-1.292	406.6
9	228.7	352.8	324.8	1355984.	0.0180	0.	7.700	0.
10	2826.0	345.1	321.0	6161067.	0.0177	0.	0.	0.
11	O.	0.	٥,	6147184.	3.2200 0.0180 0.0177 0. 5.3338 0.0174	O.	0.	0.
12	118:3	617.9	1337.3	278490.	5.3338	340.195	797.000	277.7
13	127.3	295.8	265.5	4513808.	0.0174 0.0174	Ö.	0.	0.
14	173,8	275.8	265.6	4513808.	0.0174	1.014	O.	173.8
15	63.3	514.7	1290 1	1 रक्रर	9 0533	294 184	0.384	218.5
16	63.3	268.6	237.6	139339.	0.0172	0.	4.600	Ο.
17	173.8	264.0	233.1	4513808.	O .	Ο.	0.	O.
18	38.2	413.7	1243.3	280903.	0.0172 0. 13.4391	264.528	0.528	149.2
19	38.2	205.2	173.4	420242.	0.0167	O.,	9.100	0.
20	173.8	196.1	164.5	4513808.	0.0167 0. 37.0328	0.	Ο.	0.
	11.0	233.5	1162.1	141555.	37.0328	197.914	1.814	35.6
22	11.0	167.9	135.9	561797.	0.0164	0.	7.400	0.
23	173.8	160.5	128.9	4513808.	0.	0.	0.	0.
	1500.0	200.0	171.5	Ο.	0.0166	Ο.	O.	0.
25	4.9	Ο.	1087.6	120442.	37.0328 0.0164 0. 0.0166	161.064	0.564	-161.1
	222.1	128.7	97.2	4513808.	0.0162	Ο.	0.	Ο.
27		0.	· 0.	4624765.	0.	O.,	0. 0. 0.	0.
28	0.	0.	o.	18723.	0.	Ο.	O.	٥.
29	О.	0.	Ο.	46958.	O.	0.	0.	0.
30		0.	0.	65681.	0.0162 0. 0. 0.	o.	0.	O.
	2835.9	342.6	318.5	31393.	0.0177	1.000	O.	2835.9
	O.	O.	0.	4624765.	o. o.	٥.	o. o.	0.
34	0.	0.	0.	-8551.	0.	٥.	Ο.	0.
			321.0	6192460.	0.0177	٥.	o.	0.
	2384.1		1464.7	6183909.	0.32550	.133E 37	85.583	0.
37		897.9		2772.		0.780		
38		O.,	0.	1996.	0.	O.	O	107.1
	2384.1	O.		6179141.	0.3255	٥.	85.583	O.,
					0.3891			
	1086.4	0.			0.6266	555.122		
	123.2			13575.		0.779		
43	17.1	690.5		4274.	39.8960	o.	0.455	1030.4
45	0.		0.		0.	O.	0.	0.
46		609.3	1332.8	4790.	5.1311	0.703	4.874	
47				3438.	36.6111	O.	0.682	
	. 0.			5563335.	0.	() <u>.</u>	0.	0.
49		625.1		5554519.	1.0443	479.972	23.281	0.
50				5010157.	0.	O.	0.	O.
51	511.0	999.O	1519.5	5030848.	1.6614	O.	17.541	0.

Propert 5	900.	hopes		, see,		/** f**,	F.1 1	veger goor,
							FV	
							8.647	
53					3.1996		8.486	
54		617.2				0.	4.719	O.
55		620.2			5.2071		O ,	
		617.2			5.3210		0.	
57		<b>634.3</b>	1351.7	1919.	38.2676	Ο.,	0.666	1102.3
58		643.4					0.664	
59		617.2					4.719	
60		525.3			8.9984		2.674	
61		Q.			8.5545		2.761	
62		421.3			13.2395		1.720	
63	39.7	Ο.	1233.2		12.6351		1.773	
64		233.4			35.5932		0.568	
65		0.					0.592	
దర		636.2	1352.6	9585.	39.1192	O.	0.	Ο.
67		342.7	1191.6	0.	3.7941	Ο.	Ο.	0.
68		470.0	1274.4	Ο.	251.0113	0.	O. O.	0.
69	5.1	660.4	1365.0	1581.	130.5876	0.	Ο.	Θ.
70	5.1		1365.0	4150.	130.5876	O.	0.	0.
	() "	0.	1464.7	0.	0.	O.	O.	0.
72	Õ.	0.	0.	797.	O.	0.	0.	0.
73	0.	Q "	0.	-9648.	. 0.	0.	Ο.	O.
	0.	0.	O.	6061.	O.	0.	٥.	0.
76	0.	0.	0.	1020333.	0.	0.	Ο.	0.
79	1072.9	797.8	1384.7	579451.	0.6346	553.190	41.119	0.
							0.	
81	16.7	636.2	1352.6	٥.	39.1192	o.	٥.	0.
82			0.	5010157.	0.	o.	0.	0.
83		340.2					0.	
84					1.6281			799.9
86				110957.			o.	
88	Ö.	o.	Ö.	4150.	o.		o.	
90					0.0179		o.	
91							o.	
95		122.9					3.739	
99	Ō.				0.			
	ō.	o.	ŏ.	587.		o.	o.	
				6165490.			o.	
106		0.			70.9891			
	5.0	Ō.	1088.6		70.1785			
108	1.8	122.9			188.2706			-9648.0
	o.			2352390.				
111		340.1	311.4	7143590.	0.0179	0.	0.095	o.
112	0.	0.	1440.1	55833.	0.	o.	0.	
113	O.	0.	0.	6104872.	o.	o.	0.115E 19	
114			97.0	14915.	0.0162		0.	411.6
115	411.6	128.0	97.0	8971.	0.0162	0.624	O.	411.6
116	411.6	128.0	97.0	28375.		0.623	O.	411.6
117	411.6	128.0	97.0	13843.	0.0162	0.660	o.	411.6
118	411.6	128.0	97.0	22578.	0.0162	0.660	o.	411.6
119	411.6	128.0	97.0	22274.	0.0162		ŏ.	411.6
120	O.	0.	0.	4768.	0.			0.
122	Ō.	O.	o.	4624765.	o.		o.	o.
123	4.9			686389.	0.0163			o.
125	527.5	827.0		17919.	1.3913			515.5
130	0.			256327.	0.	_		0.
131	119.3			236327. 131273.		1.019		119.3
132	117.3	617.5			5.2953			119.1
133	0.		0.		0.		0.	Ö.
201	0.1	0.	1519.8	/~*V.	0.	210.590		0.
ain No.	WA I	\_/ =	1417.0	∵ v	₩.		\w/ a	. Va

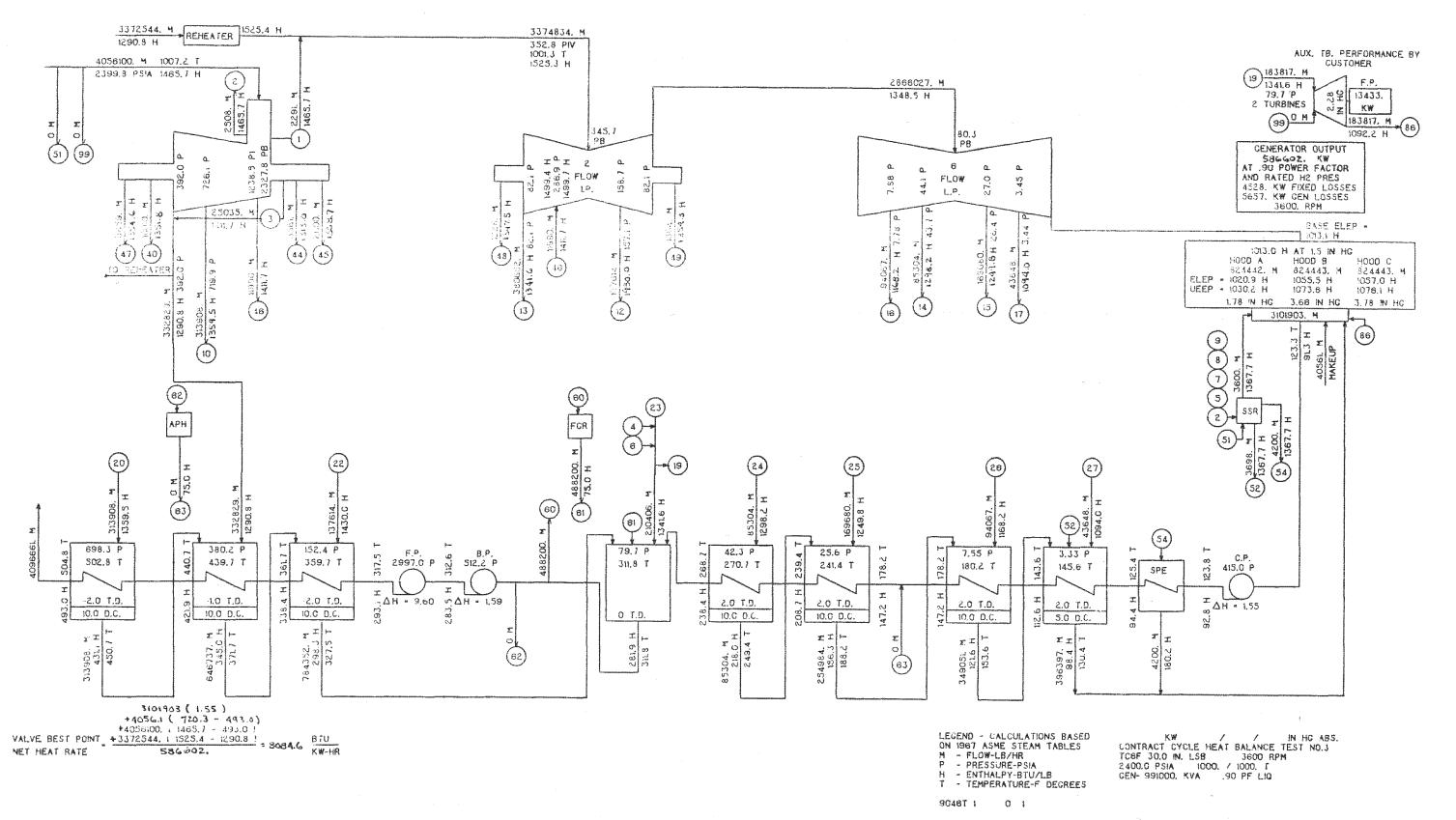
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E-9T

Fig. 9B

THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



GENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

5/14/87 Fig. 9B

VALVE POINT 2ND VL INTERMOUNTAIN PWR PROJECT 05/13/87

TEST POINT 03 UNIT #2

820000. KW 2400. PSIG

TC6F-30 IN LSB 1000./ 1000. F

TURBINE NO 270T151

2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD HEAT RATE THROTTLE FLOW 592031. 7980.0 4056100.

591526. 7986.8 4099223.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	REH	EAT TB		
			IP TB			LP TB
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2399.80	384.30	354.00	81.02		3.074
TEMP	1007.20	566.80	1000.44	621.20	<b>)</b>	115.92
ENTH	1465.68	1289.21	1524.83	1341.35	i	1046.78
ENTR	1.5365		1.7775	1.7925	5	
EFF	81.	.515	92.000		94.	013
ABSCISSA	PHPX/PT=0.18	501	P1STSTG/PT=0.5146	}	VAN=	440.9

#### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERG	BALANCE	LP TB ENERGY RHT TB	BALANCE LP TB
AE	508.50	316.38		
H ELEP	1046.78		1046.78	
H UEEP	1059.29		1059.29	
EFF ELEP	94.01	93.10	94.01	93.10
EFF UEEP	91.55	89.15	91.55	89.15
VAN	440.89		440.89	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A03-1

## T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TO ENERGY RHT TO	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
H ELEP	1048.96		1048.96	
H UEEP	1061.46		1061.46	
EFF ELEP	93.58	72.42	93.58	92.42
EFF UEEP	91.13	88.47	91.13	88.47
VAN	441.89		441.89	

### STAGE FLOW FUNCTION

STE NC		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1 4 RH 1 8 11 15	1235.50 718.77 354.00 346.92 157.60 81.02 44.64 27.27	0. 1.959 0. 0. 0.499 0. 0.156 0.110	0. 0.86 0. 0. 1.01 0. 1.01	0. 712.60 0. 0. 156.00 0. 44.19 26.95	86.6 157.4 350.2 350.2 711.2 807.6 1414.8	0. 832.0 .0. 0. 791.5 0. 1087.0	4014276. 3673957. 3375577. 3387567. 3238282. 2910222. 2825494. 2648608.	999.8 828.4 796.7 815.7 782.2 1122.1 1064.1
18 19	7.96 3.48	0.035	1.27	7.86 3.46	6018.0 12096.0	1097.7	2558119. 2497392.	1053.2

gerenie	-	-	mirro.		-	-	g-ur-	gree,	group,		georg	grange
-	-	E.	D	w	H	- 1	<u> </u>	ĸ	C	Y	L	 <b>E</b>

		1 600 600 807 44	17 1 1000 11	10-7 E 10-11 0000 0000			
						ATER	8
					4060147.6		
					326721.3		
3	DRAIN	708.80	445.80	425.69	326721.3	DC =	4.4
					HE	ATER	7
7	FW IN	2598.00	365.10	341.35	4060147.6		
					319656.0		
6	DRAIN	376.80	371.10	344.36	646377.3	DC =	6.0
3	ENTRY	708.80	445.80	425.69	326721.3		
					HE	ATER	6
10	FW IN	2728.40	316.30	291.30	4060147.6		
					149285.1		
					795662.4		
6	ENTRY	376.80	371.10	344.36	646377.3		
					P	UMP	
11	FW IN	0.	0.	0.	4021693.2		
86	SEAL INJ	0.	0.	0.	93029.4		
					54575.0		
32			0.		0.		
				218.13			
35	FW OUT	2728.40	316.30	291.30	4060147.6		
					HE	ATER	5
13	FW IN	89.01	272.80	241.90	3044763.5	OPEN	
12	EXTR	80.19	617.90	1339.77	182250.9	STO =	778.4
111	DRAIN	80.19			5171452.2	SC =	-0.3
109	ENTRY	0.	0.	247.45	1945421.4		
					HE	ATER	4
17	FW IN	131.80	243.30	212.01	3044763.8	CLOSED	
15	EXTR	43.47	514.70	1291.86	84727.4	TD =	-0.5
16	DRAIN	43.47	246.30	214.87	84727.4	DC =	3.0
					HE	ATER	3
20	FW IN	131.80	178.60	146.89			_
18	EXTR,	25.99		1245.52	176886.0	TD =	-1.1
	DRAIN	25.99	185.70	153.76	261613.4	pc =	7.1
16	ENTRY	43.47	246.30	214.87	84727.4		
					HE	ATER	2
23	FW IN	131.80	146.10	114.36	3044763.8	CLOSED	
21	EXTR	7.51	238.60	1165.62	90489.1	TD =	1.4
22	DRAIN	7.51	164.60	132.57	352102.6	DC =	18.5
	process of a speciments of the	general party games	400 70	153.76	261613.4		
17	ENTRY	25.99	185.70	120-10	201010.4		

Т	L			PRESS	TEMP	ENTH	FLOW	
88 70 68	TI TI	γc		1.57 1.85	0. 563.90 480.00 MEAS TOTA	1318.84 1279.09	2353.0 2353.0 0.	TM SEAL REG CALCULATED TO HEATER TO CONDENSER
25 123	FW EXT DRA ENT	TR AIN		3.44 3.44	125.10 0. 127.20 563.90	1094.42 95.16	3044763.8	TD = 0.8
33 87 27	LE	N OU	ΞE	o. o. o.	0. 0. 0.	0. 0. 0.	3137793.2 0. 3137793.2	UMP
4	Fu	V IN		2598.00	508.50	497.28		W TO BOILER  S+L = -4047.
	·			т	URBIN	EEXPA	NSION	
								ATH CTCAM I THE
	EX1		_E			1465.68 1465.68		AIN STEAM LINE
			F				0. 4056100.2	AIN STEAM LINE
36	THE	ROTTL		2399.80	1007.20	1465.68	0. 4056100.2 V	
36 37	LO	NO	1	2399.80 354.20	1007.20 888.64	1465.68	0. 4056100.2 V SQRT 2281.2 SQRT	ALVE STEM LKG P/V = 86.079
36 37 38	LO	NO NO	1 2	2399.80 354.20 0.	888.64 0.	1465.68	0. 4056100.2 V SQRT 2281.2 SQRT 2518.4	ALVE STEM LKG  P/V = 86.079  C = 55.758  P/V = 12.638
36 37 38	LO	NO NO	1 2	2399.80 354.20 0.	888.64 0.	1465.68	0. 4056100.2 V/ SQRT 2281.2 SQRT 2518.4	P/V = 86.079 C = 55.758 P/V = 12.638 C = 199.263
36 37 38 40 112	LO	NO NO	1 2	2399.80 354.20 0. 1235.50	888.64 0. 849.55	1465.68 0. 1409.00 1409.00	0. 4056100.2 V/ SQRT 2281.2 SQRT 2518.4 4014275.6 37025.0 PAC	ALVE STEM LKG  P/V = 86.079 C = 55.758  P/V = 12.638 C = 199.263  XP TD STG 1
36 37 38 40 112	LO LO SHE EXT	NO NO	1 2	2399.80 354.20 0. 1235.50 0.	888.64 0. 849.55 0.	1465.68 0. 1409.00 1409.00	0. 4056100.2 V/ SQRT 2281.2 SQRT 2518.4 EX 4014275.6 37025.0 PAI SQRT 9647.6	ALVE STEM LKG  P/V = 86.079 C = 55.758  P/V = 12.638 C = 199.263  XP TO STG 1  CKING NO 2  P/V = 115E 19
36 37 38 40 112 42 43	LO LO LO LO	NO NO NO	1 2	2399.80 354.20 0. 1235.50 0. 84.08	888.64 0. 849.55 0. 641.00	1465.68 0. 1409.00 1409.00 1351.05	0. 4056100.2 V/ SQRT 2281.2 SQRT 2518.4 EX 4014275.6 37025.0 PAC SQRT 9647.6 SQRT 3385.9	ALVE STEM LKG  P/V = 86.079 C = 55.758  P/V = 12.638 C = 199.263  XP TO STG 1  CKING NO 2  P/V = 115E 19 C = 0.000  P/V = 3.302

TL.	PRESS	TEME	ENTH	FLOW
41 SHELL 79 EXTR	718.77 712.60	0. 722.70	1358.47 1358.47	EXP TO STG 4 3673956.9 326721.3
				PACKING NO 1
46 LO NO 1	83.16	562.80	1312.29	SQRT P/V = 16.123 3408.0 C = 374.646
47 LO NO 2	13.63	543.10	1308.00	SQRT P/V = 3.394 2068.6 C = 775.546
100 LO NO 3	0.	Ο.,	٥.	SQRT P/V = 0.558 563.9 C = 2117.000
49 EXH 80 EXTR 50 TO RHT	384.30 384.30 384.30			EXPAND TO EXHAUST 3492951.8 319454.0 3373295.8
BEFORE LO 37 ENTRY	0.08	٥.	1525.33	REHEATER 1
	354.00	1001.30	1525.29	3375577.0 PCTDP = 7.884
51 ENTRY 125 ENTRY	346.92 359.51	1000.05 757.60	1524.83 1396.77	EXPAND TO BOWL 3387546.6 11989.6
52 SHELL 53 EXTR	157.60 156.00	o. 803.30	1419.01 1429.02	
		•		PACKING NO 3  SQRT P/V = 3.211
57 LO NO 1	13.63	627.10	1348.40	•
58 LO NO 2	13.63	641.10	1355.17	SQRT P/V = 0.536 1314.7 C = 4555.333
100 LO NO 3	٥.	Ο.	٥.	SQRT P/V = $0.533$ 563.9 C = 2117.000
100 LO NO 4	0.	0.	Ο,	SQRT P/V = 0. 543.9 C = 2117.000

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TI		PRESS	TEMP	ENTH	FLOW	
	EXH EXTR	81.02 82.83	621.20 623.60	1341.35 1342.42	2910221.	
59	ENTRY	81.02	621.20	1341.35	2910221.	EXPAND TO BOWL 7
	SHELL EXTR		0. 530.10	1282.30 1299.28	2825494.: 84727.	
	SHELL EXTR	27.27 26.95	0. 425.50	1237.67 1250.49		
	SHELL	7.96 7.86	0. 245.60	1144.85 1168.78	2558119. 90489.	
	SHELL EXTR	3.48 3.46	o. o.	1093.58 1094.42	2497391.	
76 22	TB EXH ENTRY ENTRY DRAIN	1.51 0. 7.51	115.92 0. 164.60	1059.2922 0. 132.57 0.	283268. 352102.	5
						GENERATOR 1 SHAFT 1
		D = 59203 = 601607		PF = 0.99 FL =4353.0		= 58.00 = 5223.5

## PERFORMANCE

## TRUNKLINE OUTPUT

TL	F	7	Н	Q	sv	SP	PV	TR
1	2598.0	508.5	497.3	4060148.	0.0202	0.	PV 0.	-4047.4
2	708.8	720.7	1357.5	326721.	0.9166	504.477	-4.023	216.2
	708.8					0.		
4	2598.0	441.4	422.3	4060148.	0.	0.	0.	0.
5	376.8	566.0	1289.4	319656.	1.5086	438.791	-2.609	127.2
6	376.8	371.1	344.4	646377.	0.0182	0.	6.000	0.
7	2598.0	365.1	341.3	4060148.	0.	0.	0.	0.
8	155.7	800.9	1427.8	149285.	4.7626	361.381	-3.719	439.5
9	155.7	321.7	292.3	795662.	0.0177	0.	5.400 0.	0.
10	2728.4	316.3	291.3	4060148.	0.0174	0.	0.	0.
11	0.	0.	0.	4021693.	0.	0.	0.	0.
12	80.2	617.9	1339.8	182251.	7.9129	312.204	778.400	305.7
13	89.0	272.8	241.9	3044764.	0.0172	0.	0.	0.
14	131.8	272.8	242.0	3044764.	0.0172	1.014	0.	131.8
15	43.5	514.7	1291.9	84727.	13.2309	272.313	-0.487	242.4
16	43.5	246.3	214.9	84727.	0.0170	0.	3.000	0.
17	131.8	243.3	212.0	3044764.	0.	0.	O.	0.
18	26.0	414.9	1245.5	176886.	19.8773	242.229	-1.071	172.7
19	26.0	185.7	153.8	261613.	0.0165	0.	7.100	0.
20	131.8	178.6	146.9	3044764.	0.	0.	O.	٥.
	7.5	238.6	1165.6	90489.	55.0083	180.006	1.406	58.6
					0.0164		18.500	0.
23	131.8	146.1	114.4	3044764.	0.	0.	O.	O.
24	1500.0	246.5	218.1	0	0.0169	0.	0.	0.
25	3.4	0.	1094.4	60728.	0	146.922	0.822	-146.9
26	171.0	125.1	93.5	3044764.	0.0162	0.	0.	0.
27	٥.	O.	o.	3137793.	0.	0.	0.	0.
28		0.	0.	16805.	0.	0.	0.	0.
	0.	0.	0.	37770.	0.	0.	0.	0.
	0.	٥.	0.	54575.	O.		0.	0.
					0.0173		0.	٥.
33				3137793.			0.	0
				-4047.		0.	0.	0.
					0.0174			
							86.079	
37		888.6				0.780		
38	O.	0.	0.	2518.	0.	0.	٥.	199.3
	2399.8	0.		4051301.		Ģ.	86.079	0.
40				4014276.				
41	718.8	0.		3673957.				
42		641.0			7.7125			0.0
43	13.7	638.5	1353.9			٥.	0.535	1196.3
45	_0	0.		25035.	0.	0.	0.	0.
46		562.8					3.394	
47	13.6	543.1		2069.	43.7136	0.	0.558	775.5
48	0.	0.		3698992.	0.	0.	0.	o.
49	384.3	566.8			1.4783		16.123	0.
50	384.3			3373296.		0.	0.	0.
51	346.9	1000.1	1524.8	3387567.	2.4682	0.	11.859	0.

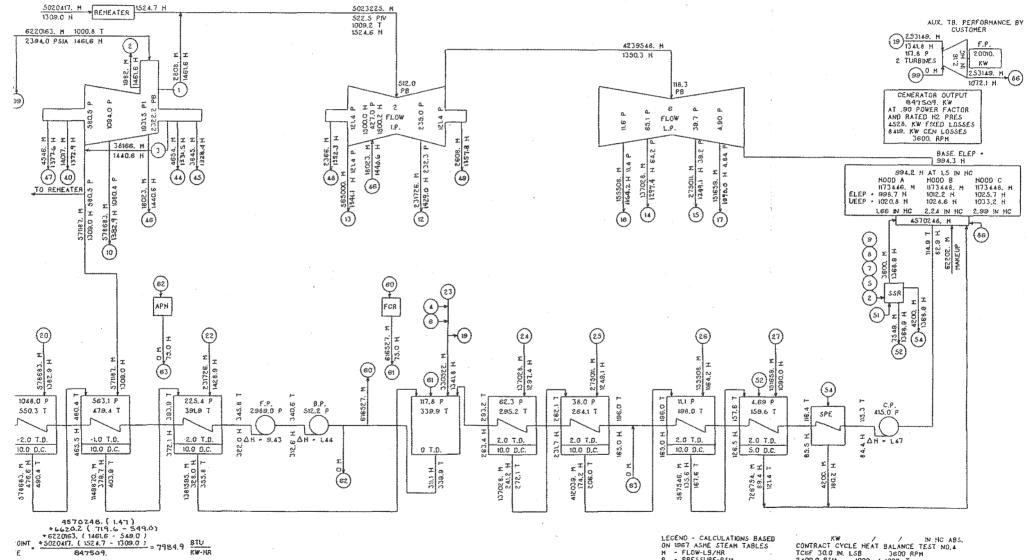
				*				
TL	F	T	Н	Q	SV	SP	PV	TR
52		٥.	1419 0		4.6515	342 797	5.821	
						7/4 27/	En market with	/ tu/
53		800.0	1427.0	149285.	4.7628	201.224	5.723	0.
54	81.0	621.2	1341.3	3234601.	7.8559		3.211	0.
55	82.8	623.6	1342.4	324379.	7.7001	314.452	0.	0.
56		621.2	1741 7	2910222	7.8559	312 917	0.	0.
57			1348.4		47.4065	u.	0.536	
58	13.6	641.1	1355.2	1315.	48.0213	0.	0.533	
59	81.0	621.2	1341.3	2910222.	7.8559	0.	3.211	0.
60	44.2	530.1			13.2263			
61		٥.					1.877	
62	27.0	425.5	1250.5	176886.	19.4038	244.258	1.179	0.
63	27.3	0.	1237.7	2648608.	18.6886	245.363	1.208	1084.7
64							0.385	
65		0.					0.404	
66	13.4	612.0	1341.1	8173.	47.4053	0.	0.	0.
67	80.2	315.0	1184.7	٥.	5.4836	0.	0.	0.
68		480.0	1770 1	^	302.4288	0.	Δ.	0.
						· ·	· ·	
	1.6	563.9			387.7559			
70	1.6	563.9	1318.8	2353.	387.7559	0.	0.	0.
71	0.	0.	1465.7	. 0. 778.	O.			0.
72	0.	0		770	0.			o.
		0.	0.	//@s	0.	· ·		
73		0.	o.	-5031.	0.	0.	0.	٥.
75	0.	0.	0.	4789.	0.	0.	0.	0.
76	o.	0.	0.	283268.	0.	0.	0.	0.
79		722.7	1750 5	マワムフワイ	0.9134	505 075		
				~/			## 7 # 7 <del>**</del> 2 ##	
80	384.3			319656.		O.		0.
81	13.4	612.0	1341.1	0.	47.5471	0.		٥.
82	٥.	0.	0.	3373296.	0.	0.	0.	0.
	80.2		1187 1	205	0.	0.	0.	0.
			troe 7	min min and lim lim and mid one per per st	2 4407	7 004		
84			1070.9	33/33//.	2.4187	/.884	12.078	796.7
86	0.	0.	0.	93029.			O.	٥.
88	٥.	٥.	٥.	2353.	0.	0.	O.	0.
90		312.5	282.7	0.		٥.	0.	٥.
	114.8				0.0170	O 487	ŏ.	
91					0.0170			
95	1.5	115.9					3.074	440.9
77	0.	0.	٥.	6204.	0.	0.	0.	0.
100	0.	0.	0.	564.	0.	0.	0.	2117.0
	2598.0				0.0202			
106	3.5	0.			100.7990			0.
107	3.5	0.	1093.6	2497392.	100.2007	0.	0.186	1108.1
108	i.5	115.9	1059.3	2497392.	226.3461	1059.292	3.074	-5031.0
109	0.			1945421.	0.		0.	Q.
	80.2	312.5		5171452.		o.	-0.296	ŏ.
112	0.	0.		37025.	0.	0.	0.	٥.
113	0.	0.	0.	4000678.	O.,	O.	0.115E 19	0.
114	474.8	123.5	92.7	14413.	0.0162	0.624	0.	474.8
115	474.8	123.5			0.0162			474.8
			72.1	8053.				
116	474.B	123.5	92.7		0.0162			474.B
117	474.8	123.5	92.7	18791.	0.0162	0.660	0.	474.8
118	474.8	123.5	92.7	0.	0.0162	0.	0.	0.
	474.8		92.7	0. 25311.	0.0162	0.660		474.8
			· /2.s/	*****				
120	0.	0		4800.	O.	0.	0.	0.
122	0.	0.		3137794.	0.	0.	٥.	0.
123	3.4	127.2	95.2	63081.	0.0162	0.	2.100	٥.
125	359.5	757.6		11990.	1.9516	0.628	0.	350.7
130	0.	0.				0.020	ŏ.	0.
			0.		0.			
131	81.4		1339.7		7.7968		0.	81.4
132	81.4	617.6	1339.5	77804.	7.7916	1.019	0.	81.4
133	0.	0.	0.	154620.	0.	0.	0.	0.
201	0.1	o.	1525.3	0.	o.	236.117	0.	0.
لمه مما سند	V= 1	V-s	ث وليكند	V.	V.	/ الماد الاست	v.	V*

A03-E

#### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

#### CALCULATED DATA - NOT CUARANTEED

RATING FLOW IS \$974568, H. AT INLET STEAM CONDITIONS OF 24/2.2 PSIA AND 1000,0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS. ETC. WHICH HAY AFFECT THE FLOW. THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS S.O PERCENT) OF 6273296, H. THE EQUIVALENT DESIGN FLOW AT 2394.0 PSIA AND 1000.8 T IS 622030, M. THE VALUE OF CEMERATOR OUTPUT SHOWN ON THIS HEAT BALLANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CEMERATOR AUXILIARIES HAS BEEN DEDUCTED.



CONTRACT CYCLE HEAT BALANCE TEST No. 4

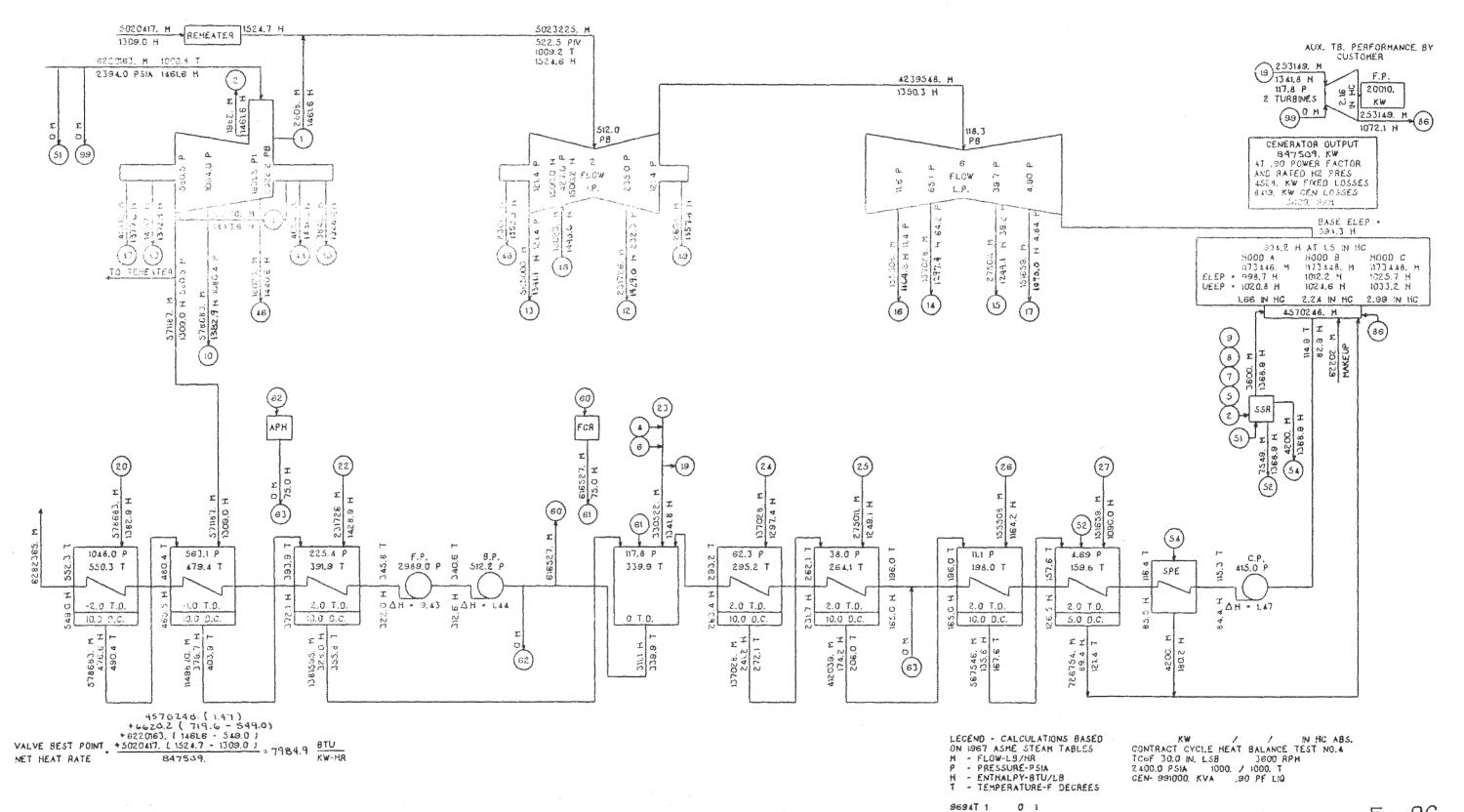
- PRESSURE-PSIA H - ENTHALPY-BTU/LB T - TEMPERATURE-F DECREES KW IN HC ABS.
CONTRACT CYCLE HEAT BALANCE TEST NO.4
TC6F 30.0 IN. LSB 3600 RPH
2400.0 PSIA 1000. / 1000. T CEN- 991000. KVA

MAT

Fig. 9C

#### CALCULATED DATA - NOT CUARANTEED

RATING FLOW IS 5974568. H. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS. ETC. WHICH MAY AFFECT THE FLOW, THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS S.O PERCENT) OF 6273296, M THE EQUIVALENT DESIGN FLOW AT 2394.0 PSIA AND 1000.8 T. IS 6220190. M. THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



CONTRACT CYCLE HEAT BALANCE TEST No.4

CENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

F16. 9C 5/14/87

VALVE POINT VWO INTERMOUNTAIN PWR PROJECT 05/13/87

TEST POINT 04 UNIT #2

820000. KW 2400. PSIG

TC6F-30 IN LSB 1000./ 1000. F

TURBINE NO 270T151 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD HEAT RATE THROTTLE FLOW

859850. 7875.4 6220163.

858986. 7883.3 6281116.

#### TURBINE THERMAL PERFORMANCE

	HIGH FRE	ESS TB	REHEAT TB				
-			IF -	ΓB		LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH	
	2394.00	571.20	526.10	118.90		3.809	
TEMF	1000.80	623.00	1008.54	623.60	)	123.63	
ENTH	1461.62	1307.52	1524.17	1340.15	5	1036.53	
ENTR	1.5339		1.7343	1.7497	7		
EFF	87.	890	91.77	78	93.	662	
ABSCISSA	PHPX/PT=0.23	386	P1STSTG/PT=0.8	3046	VAN=	515.2	

#### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERG	Y BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
AE	520.63	327.60		
H ELEF	1036.53		1036.53	
H UEEP	1045.20		1045.20	
For Law Law Law Company	93.66	92.68	93.66	92.68
	92.00	90.03	92.00	90.03
VAN	515.24		515.24	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA-AND TEMP. OF 1000 F.

A04-1

	TOTAL TO ENERG	N DALANCE	LP TB ENERGY	DALANCE
	TOTHE TO ENERG	) Y DHLHINLE	LE ID ENEROY	CHL.HIVLE
	RHT TB	LP TB	RHT TB	LF TB
H ELEF:	1038.88		1038.88	
	1047.54		1047.54	
EFF ELEP	93.21	91.96	93.21	91.96
EFF UEEF	91.55	89.32	91.55	89.32
VAN	516.51		516.51	

#### STAGE FLOW FUNCTION

STG SHELL NO PRESS	ONE VEL HD	PCT DELTA	FLANG P PRESS		G/AP H FLG	GFS	Q/AP H SHL
1 1926.20 4 1088.56 RH 1 526.10	0. 4.272 0.	0. 1.24 0.	0. 1075.10	86.6 157.4 350.2	0. 850.2 0.	6159187. 5560286. 5041443.	1006.3 844.9 799.8
8 515.58 11 234.73	0. 0.820	0. 1.12	0. 232.10	350.2 711.2	o. 791.8	5059466. 4825868.	818.9 782.1
15 118.90 15 65.64 16 39.97 18 11.70	0. 0.289 0.191 0.058	0. 1.28 1.39 1.44	0. 64.80 39.42 11.53	807.6 1414.8 2021.4 6018.0	0. 1089.6 1105.0 1086.5	4304371. 4164668. 3882181. 3739758. 3622591.	1129.1 1064.6 1082.1 1046.4 1119.5

Ο.

174.90

63.55

63.55

174.90

38.11

38.11

63.55

174.90

11.09

11.09

38.11

ο.

264.40

269.10

196.30

418.70

205.50

269.10

160.60

236.80

168.10

205.50

520.30

109 ENTRY

17 FW IN

15 EXTR

16 DRAIN

20 FW IN

18 EXTR

19 DRAIN

16 ENTRY

23 FW IN

21 EXTR

22 DRAIN

19 ENTRY

		FEED	WATER	CYCLE			
					HE	ATER	8
4	FW IN	2762.80	479.10	463.91	6224686.7	CLOSED	
Z	EXTR	1065.00	792.10	1381.58	580635.6	TD =	0.4
3	DRAIN	1045.00	486.30	471.76	580635.6	DC =	7.2
					HE	ATER	7
7	FW IN	2762.80	395. 20	373.10	6224686.7		•
		558.00			551437.6		-0.6
		558.00			1132073.2		8.8
		1065.00	486.30		580635.6	AN CO	W 8 W
*****	***** * * * * * * * * * * * * * * * *	and the fine of H 100 to 1	3 Secol Stant St. Secol Sec.	5 F als 86 F Sour	Control Control Control Control Control		
					HE	ATER	6
10	FW IN	2911.50	345.80	321.88	6224686.7	CLOSED	
8	EXTR	230.30	807.20	1427.95	233597.1	TD =	-1.4
9	DRAIN	230.30	353.50	325.58	1365670.3	DC =	7.7
Ó	ENTRY	558.00	404.00	379.76	1132073.2		
					Þ	UMF'	
11	FW IN	0.	0.	0.	6180136.6		
	SEAL INJ	Ö.	o.	o.	110300.1		
	SEAL RET	O.	o.	Ŏ.	65750.0		
32	LEAKAGE	o.	o.	o.	0.		
			295.40		o.		
35	FW OUT		345.80		6224686.7		
			,				
						ATER	5
1-3	FW IN			265.92			
12	EXTR		624.10		280170.6		0.
111	DRAIN	118.70	340.50	311.78	7090343.3	SC =	-0.1

276.69 2275877.0

233.51

1292.84

238.08

164.74

1245.78

173.68

238.08

128.97

1163.62

136.08

173.68

0.3

4.7

-0.1 9.2

2

1.8

7.5

3

HEATER

HEATER

HEATER

TD =

TD =

DC =

TD =

DC =

4534595.7 CLOSED

4534595.7 CLOSED

4534595.7 CLOSED

139702.6 DC =

139702.6

282487.1

422189.7

139702.6

142423.2

564612.9

422189.7

TI			PRESS	TEMF'	ENTH	FLOW	
	TDV TDV		3.15 0.29	651.90	1361.01 1279.24	STM SEAL REG 3936.1 CALCULATED 3821.2 TO HEATER 114.9 TO CONDENSER 0.	
25 123 22	EXTR DRAIN		4.88 4.88 11.09	134.80	1091.45 102.76 136.08	HEATER 1 4534595.7 CLOSED 117166.9 TD = 0.6 685601.1 DC = 5.1 564612.9 3821.2	•
33 87 27	LEAKA	GE			Ο.	PUMF 4644895.8 o. 4644895.8	
		•				FW TO BOILER	
1.	FW IN		2762.80	551.90	548.78	6224686.7 S+L = -4523.	
			T	URBIN	EEXPA	NSION	
	EXIT THROTT			0. 1000.80		MAIN STEAM LINE 0. 6220163.4	,
						VALVE STEM LKG	
37	LO NO	1	524.30	892.55	1461.62	SQRT P/V = 86.150 2790.9 C = 55.578	
38	LO NO	2	0.	0.	0.	SQRT P/V = 18.853 1997.1 C = 105.928	
			1926.20	938.50 O.		EXP TO STG 6159186.8 56188.6	Benede
	•					PACKING NO 2	
42	LO NO	1	123.86	488.00	1372.30	SQRT P/V =.115E 19 13628.6 C = 0.000	
43	LO NO	2	15.20	<b>686.</b> 10	1376.99	SQRT P/V = 4.770 4032.0 C = 971.961	
100	LO NO	3	0.	٥.	٥.	SQRT P/V = 0.582 604.5 C = 2057.052	
						A04-4	

TL.	PRESS	TEME	ENTH	FLOW
				EXP TO STG 4 5560286.2 580635.6
				PACKING NO 1
46 LO NO 1	122.51	605.70	1330.94	SQRT P/V = 23.538 4483.2 C = 355.283
47 LO NO 2	15.09	584.70	1327.85	SQRT P/V = 4.908 3275.0 C = 790.423
100 LO NO 3	O.,	٥,	٥.	SQRT P/V = 0.406 604.5 C = 2057.052
49 EXH 80 EXTR 50 TO RHT	571.20	623.00	1307.52	
BEFORE LO			1524.56	REHEATER 1 0. 5041442.9 PCTDP = 7.896
C4 HM (ER LU	Jaco a 10	1007	lukt t	EXPAND TO BOWL
				5059465.5 18022.6
52 SHELL 53 EXTR				EXP TO STG 11 4825848.4 233597.1
				PACKING NO 3
57 LO NO 1	15.05	636.40	1352.81	SQRT P/V = 4.720 1783.3 C = 1063.375
58 LO NO 2	15.08	647.70	1358.29	SQRT P/V = 0.590 2027.1 C = 5488.745
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.588 604.5 C = 2057.052
100 LO NO 4	0.	0.	٥.	SQRT P/V = 0. 604.5 C = 2057.052

T.L.	PRESS	TEMP	ENTH	FLOW
56 EXH	118.90	, 623 - 60	1340.15	EXPAND TO EXHAUST
55 EXTR			1341.60	
59 ENTRY	118.90	623.60	1340.15	EXPAND TO BOWL 4304370.8
61 SHELL	<b>65.64</b>	٥.	1282,19	EXP TO STG 15
60 EXTR	64.80	531.20	1298.10	139702.6
				pour 5,7 pour, cope pour, constraine pour
63 SHELL 62 EXTR			1237.49 1249.50	
65 SHELL	11.70	0.	1145.04	EXP TO STG 18
64 EXTR			1164.76	
				EXP TO STG 19
107 SHELL 106 EXTR	5.03 4.97	o. o.	1092.13 1091.45	
TL	PRESS	TEMP	ENTH	FLOW
108 TB EXH	1 87	127 A7	1045 2040	CONDENSER SHAFT 1 3622591.0 LEVL = -4823.0
76 ENTRY 122 DRAIN	O.		0.	
				GENERATOR 1 SHAFT 1
MEASURED LOA SHAFT 1 KV			PF = 0.98° FL =4353.0	7 H2 = 64.00 GL = 7527.1

A04-6

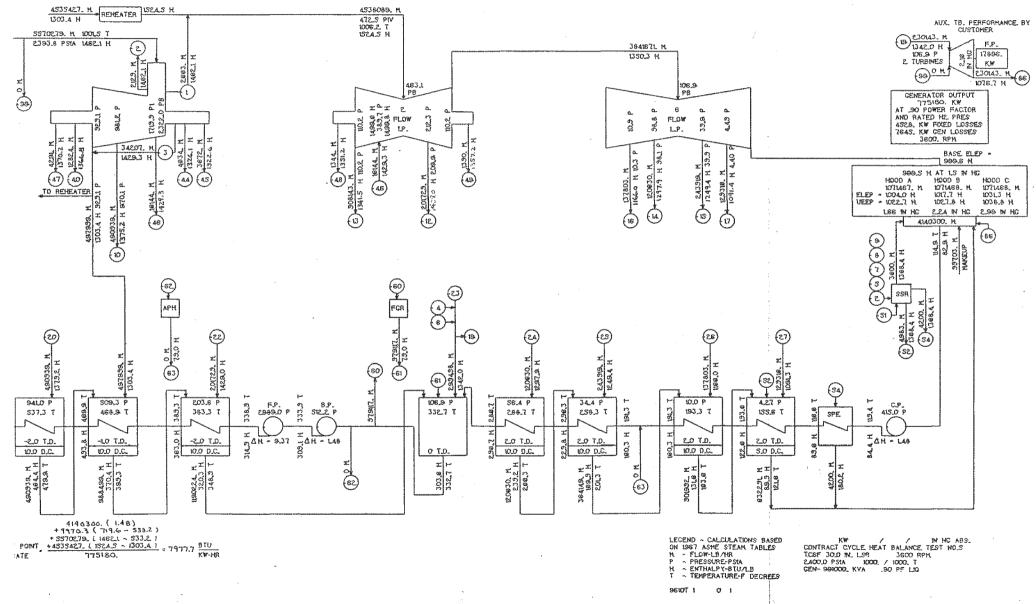
#### PERFORMANCE

### TRUNKLINE OUTPUT

dagen g	<b>p</b> ,	***		,		SF	F'V	online Boss.
	, m, m, m, ed			0				TR -4523.3
	2762.8				0.0212			
	1045.0	792.1					0.379	239.8
	1045.0				0.0200	O.	7.200	0.
	2762.8			6224687.		0.	O.	O.,
5		622.0		551438.		478.464	-0.636	0. 143.5 0.
6				1132073.		Q.		_
	2762.8			6224687.	O.,	O.	0.	0. 413.4
8		807.2		233597.		393.810		
	230.3	353.5	325.6	1365670.	0.0180	0.	7.700	
	2911.5			6224687.	0.0177	0.	0.	0.
11		. O.	. O.*	6180137.	0.	O.	0. 0. 0.	0.
12		624.1	1340.4	280171.	5.3481	340.448	Ο.	283.7 0. 174.9
13		296.2	265.9	4534595.	0.0174	O.	O.,	0.
14		296.2	266.0	4534596.	0.0174	1.014	٥.	174.9
15	63.6	520.3	1292.8	139703.	9.0660	296.486	0.286	223.8
16	63.6	269.1.	238.1	139703.	0.0172	0.	4.700	Ο.
17	174.9	264,4	233.5	4534596.	<b></b> .	, <b>-</b> ,	0.	O .
18	38.1	418.7		282487.	13.5632	0. 264.340	-0.060	0. 154.4
19	38.1	205.5	173.7	422190.	0.0167		9.200	0.
20	174.9				0.		/**s	^
21	11.1	236.8	1163.6	142423.	37.0413	198.140	1.840	38.7
22					0.0164		7.500	0.
	174.9	160.6	129.0	4534596.	O	0.	0.	0.
24	1500.0			0.	0.0173	o.	0.	0.
25		Ο,	1091.5	117167.	o.		0.576	
26		129.7	98.2	4534596.	0.0162		0.	0.
27		O.		4644896.		0.		0.
28	Ŏ.	o.	o.	18646.	0.		o.	o.
29		0.	0.	47104.	0.	Ö.	O.	O.
30			0.	65750.	o.	o.	o.	0.
	2923.9	333.9	309.7	Ö.	0.0176		o.	0.
33		0.	O.	4644896.	0.	o.	o.	o.
34	.=.	o.						o.
	2911.5	345.8	321.9	6224687.	0.0177	o.	٥.	٥.
	2394.0	1000.8	1461.6	6220163.	0.3226	1461.622	86.150	
37	526.3	892.6	1461.6	2791.	1.4807	0. 0. 1461.622 0.780	18.853	55.6
	Ö.	O.	0.	1997.	Ö.	0.	0.	105.9
	2394.0	ō.		6215375.	0.3226		86.150	0,
		938.5		6159187.		146.478	70.678	Õ.
	1088.6	0.		5560286.	0.6227		41.812	844.9
42		688.0		13629.	5.4431		4.770	0.0
43		686.1	1377.0		44.8245	0.	0.582	972.0
45		O.	0.		0.	ŏ.	0.	ō.
46		605.7	1330.9	4483.	5.0854	0.703	4.908	355.3
47		584.7	1327.8		41.1273	0.	0.606	790.4
48	0.	O.		5578452.	0.	ŏ.	0.	0.
49	571.2	623.0		5590090.	1.0310		23.538	o.
50				5038652.	0.	0.	O.	0.
51	515.6	1008.0		5059466.		0.	17.642	o.
in the	માત્રમાં કોનો	*******	A what is a sin	UUU7400.	4 = C) W / W	W s	I/ s UTAL	'' α

TL.							FV	
52	234.7	O.	1419.5	4825868.	3.1180	395.860	8.676	782.1
53	232.1	808.8	1428.7	233597.	3.1963	394.484	8.522	0.
54		623.6					4.720	
55		626.9			5.2110		0.	
56		623.6			5.3364		() w	
57		636.4		1783.	43.2953	Ο.	0.590	1063.4
58	15.1	647.7	1358.3	2027.	43.6577	0.1	0.588	5488.7
59	118.9	623.6	1340.1	4304371.	5.3364	0.	4.720	0.
60		531.2					2.684	
61		(_) _					2.765	
62		426.7			13.2325			
							1.726	
63		Ο.,			12.6906		1.775	
64		239.5			35. <i>7</i> 583		0.568	
65	11.7	() <sub>*</sub>	1145.0	3739758.	33.1685	201.139	0.594	1046.4
66	14.7	634.4	1351.9	9178.	44.1865	0.	0.	0.
67		343.2	1191.8	o.	3.7835	0.	0.	٥.
68			1279 2	11=	1903 7423	ō.	o.	O.
		451.9					Ö.	
		651.9					0.	
71	0.	O.,	1461.6	0.	0.	Ο.,	0.	۰.
73	0.	0.	Ο.,	-4823.	O <sub>w</sub>	0.	O.	0.
75	0.	0.	O.,	5552.	0.	0.	0.	0.
					0.		0.	
					0.6305		41.292	
							0.	
							o.	
82			O.,	5038652.	O.	Q *	٥.	O.
83		340.4					0.	
84							17.998	
86	On.	O.,	0.	110300.	0.	O.	0.	0.
88	· 0.	0.	0.	3936.	0.	0.	0.	0.
90					0.0179	0.	0.	0.
91							0.	
95		123.6					3.809	
							0.	
100					o.			
					0.0212			2762.8
106	5.0	Ο.	1091.5	117167.	71.0138	161.990	0.265	0.
107	5.0	0.	1092.1	3622591.	70.2487	Ο.	0.268	1119.5
108	1.9	123.6	1045.2	3622591.	185.0160	1045.204	0.268 3.809	-4823.0
109	O .	0.	276.7	2275877.	0.	O.	0.	O.
111	118.7	340.5	311.8	7090343.	3.7666	O.	-0.052	0.
112	O.,	0.	1437.3	56189.	0.	0.	Ο.	O.
113	0.	0,	0.	6140922.	0.	0.	0.115E 19	0.
114		128.8	97.8	14783.	0.0162	0.624	0.	410.1
115	410.1	170 0	07 0	9013.	0.0162	0.624	Ŏ.	410.1
	71 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4	120.0	// s C/	75759	0.0102			
116	410.1	128.8	77.0	28198.	0.0102	0.623		410.1
117	410.1	128.8	97.8	13915.	0.0162	0.660	0.	410.1
118	410.1	128.8	97.8	22392.	0.0162	0.660	O.,	410.1
119	410.1	128.8	97.8	21999.	0.0162	0.660	0.	410.1
120	0.	0.	٥,	4788.	0.	0.	0.	0.
122	0.	0.		4644896.	0.	0.	0.	
				685601.			5.100	
125				18023.				519.8
130				254419.				0.
				124889.				119.9
132	119.7			129531.				119.7
		0.			0.			٥.
201	0.1	Ο.	1524.6	0.	0.	217.041	0.	0.

A04-E

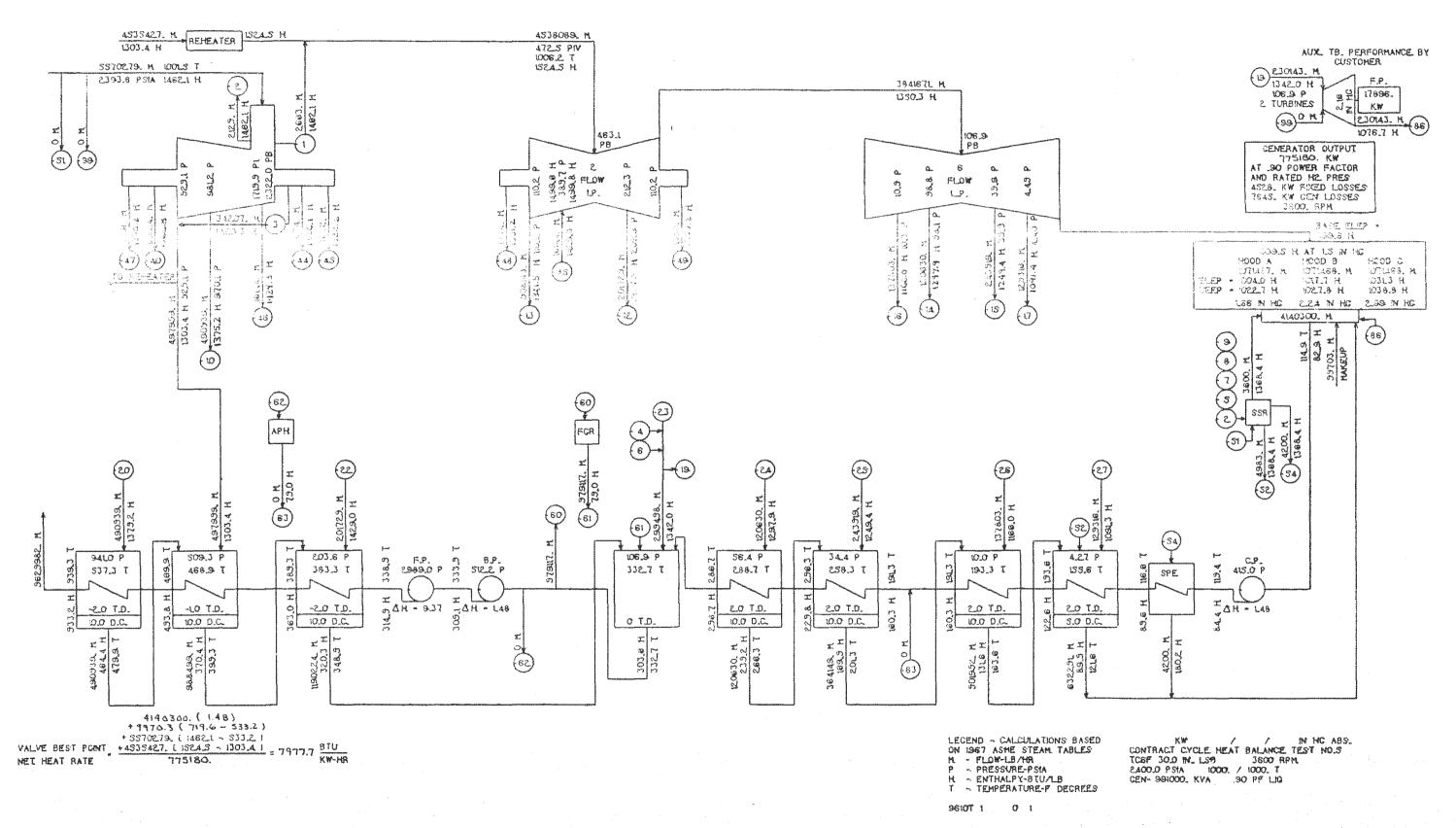


ERAL ELECTRIC COMPANY\_ SCHENECTADY N.Y.

P14\_004958

TP-5 5/14/87 FIG. 9D

THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



GENERAL ELECTRIC COMPANY. SCHENECTADY N.Y.

5/14/87 Fig. 9D

VALVE POINT 3RD VL 05/14/87 TEST POINT 05
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC6F-30 IN LSB TURBINE NO 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

 TOTAL LOAD
 785980.
 785201.

 HEAT RATE
 7858.4
 7866.2

 THROTTLE FLOW
 5570279.
 5627468.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRI	ESS TB	R			
			IP TB	LP TB		
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2393.80	514.80	475.00	107.50		3.403
TEMP	1001.50	606.10	1005.50	622.90	)	119.54
ENTH	1462.09	1301.65	1524.01	1340.52		1036.93
ENTR	1.5343		1.7452	1.7610	)	
EFF	86.	. 181	91.583		93.	569
ABSCISSA	PHPX/PT=0.2	151	P1STSTG/PT=0.71	<b>61</b>	VAN=	522.6

THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

	TOTAL TB ENERG	Y BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	520.56	327.90		
H ELEP	1036.93		1036.93	
H UEEP	1045.45		1045.45	
EFF ELEP	93.57	92.59	93.57	92.59
EFF UEEP	91.93	89.99	91.93	89.99
VAN	522.60		522.60	

\* LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A05-1

## T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TB ENE	RGY BALANCE	LP TB ENERGY	' BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1039.18		1039.18	
H UEEP	1047.69		1047.69	
EFF ELEP	93.14	91.90	93.14	91.90
EFF UEEP	91.50	89.30	91.50	89.30
VAN	523.84		523.84	

#### STAGE FLOW FUNCTION

STE NO		ONE VEL HD	PCT DELTA	FLANE P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1714.30	0.	0.	0.	86.6	0.	5515140.	1005.3
4	975.78	3.487	1.13	964.80	157.4	846.4	4998137.	841.6
RH 1	475.00	0.	0.	0.	350.2	0.	4546814.	799.0
8	465.50	0.	0.	0.	350.2	0.	4562958.	818.0
11	211.53	0.727	1.10	209.20	711.2	792.6	4354230.	783.1
15	107.50	0.	0.	0.	807.6	0.	3898551.	1131.7
15	59.41	0.244	1.19	58.70	1414.8	1091.7	3776322.	1067.5
16	36.23	0.165	1.32	35.75	2021.4	1107.7	3526673.	1085.9
18	10.60	0.051	1.40	10.45	6018.0	1092.9	3400059.	1051.2
19	4.55	0.017	1.06	4.50	12096.0	1130.0	3296859.	1124.0

-	 	ence.		***	emor		-	-		and the same		alese
_	 -	D	W	Α	-	=	R	C	Y	C	L	E.

						ATER	8
	FW IN	2679.90	469.20	452.85	5573373.4	CLOSED	
	EXTR	955.00	771.40	1374.49	500222.7	TD =	-1.5
3	DRAIN	955.00	475.40	459.20	500222.7	DC =	6.2
					LIC	ATER	7
	FW IN	2679.90	387.20	364.57	5573373.4	CLOSED	•
	EXTR	503.00	605.10	1302.02	480036.8	TD =	-1.6
		503.00	395.00	370.01	980259.6	DC =	7.8
	DRAIN ENTRY	955.00	475.40	459.20	500222.7	DC -	7 = 0
->	ENTRY	735.00	4/5.40	437.20	500222.7		
					HE	ATER	6
10	FW IN	2826.30	337.80	313.50	5573373.4	CLOSED	
	EXTR	207.70	805.10	1427.80	208728.4	TD =	-2.2
	DRAIN	207.70	344.70	316.32	1188987.9	DC =	6.9
	ENTRY	503.00	395.00	370.01	980259.6	bed. Fin	
	mar 7 1 6 5 5			0,000			
					P	UMP	
11	FW IN	0.	0.	0.	5527238.3		
86	SEAL INJ	0.	0.	O.	109560.8		
30	SEAL RET	0.	0.	O.	63425.7		4
32	LEAKAGE	0.	0.	0.	0.		
24	EXTR	1500.00	276.90	248.86	0.		
35	FW OUT	2826.30	337.80	313.50	5573373.4		
					, 40	A Trans	
4 ***	COLUMN TAI	444 80	000 10	cec / A		ATER	5
13	FW IN	116.40	290.10	259.64	4086605.4	OPEN	anger op a
12	EXTR	107.30	622.40	1340.28	252175.2	STO =	257.4
111	DRAIN	107.30	333.10	304.04	6488791.0	SC =	-0.1
109	ENTRY	0.	0.	267.06	2150540.7		
					HE	ATER	4
17	FW IN	161.80	259.00	228.00	4086606.2		•
	EXTR	57.64	519.10	1292.77	122229.4	TD =	0.0
	DRAIN	57.64	263.10	231.95	122229.4	DC =	4.1
10	DIVITA	₩ WT	200 40	ALL 12 18 17 144	ally affres allow allows IP III "E	AUF COP	7
					HE	ATER	3
20	FW IN	161.80	191.90	160.29	4086606.2	CLOSED	
18	EXTR	34.52	418,00	1245.90	249649.0	TD =	-0.5
	DRAIN	34.52		168.64		DC =	8.6
	ENTRY	57.64		231.95			
	-						
						ATER	2
	FW IN	161.80			4086606.2		
	EXTR	10.05	237.60	1164.34	126613.3	= aT	1.5
22	DRAIN	10.05	163.70	131.67	498491.7	DC =	7.1
19	ENTRY	34.52	200.50	168.64	371878.4		

TL	PRESS	TEMP	ENTH	FLOW	
70 TDV 48 TDV	4.54 2.03	676.10	1372.67 1279.07	3190.9 3190.9 0.	
25 EXTR 123 DRAIN	4.42 4.42 10.05	0. 131.10	1092.40 99.06 131.67	HEA 4086606.2 103200.7 604883.3 498491.7 3190.9	TD = 0.4
33 FW IN 87 LEAKAGE 27 FW OUT		o. o.	o. o.	Pl 4196167.0 0. 4196167.0	JMP
				Fŧ	TO BOILER
1 FW IN	2679.90	540.50	535.00	5573373.4	S+L = -3095.
	т	URBIN	EEXPA	NSION	
71 EXIT 36 THROTTLE		0. 1001.50		0.	AIN STEAM LINE
					ALVE STEM LKG
37 LO NO 1	475.20	890.02	1462.09		P/V = 86.110 C = 55.599
38 LO NO 2	0.	0.	0.		P/V = 17.013 C = 125.620
40 SHELL 112 EXTR				5515140.0	KP TO STG 1
				PAC	CKING NO 2
42 LO NO 1	112.39	674.00	1365.89		P/V =.115E 19 C = 0.000
43 LO NO 2	16.85	670.50	1369.29		P/V = 4.353 C = 1005.031
100 LD ND 3	0.	0.	0.		P/V = 0.650 C = 1879.144

A05-4

TL	FRESS	TEMP	ENTH	FLOW
41 SHELL . 79 EXTR	975.78 964.80	0. 772.40	1374.59 1374.59	EXP TO STG 4 4998137.0 500222.7
				PACKING NO 1
46 LO NO 1	111.24	592.80	1325.23	SQRT P/V = 21.336 4437.6 C = 381.695
47 LO NO 2	16.79	572.30	1321.77	SQRT P/V = 4.482 3091.7 C = 826.983
100 LO NO 3	0.	٥.	0.	SQRT F/V = 0.678 614.5 C = 1879.144
49 EXH 80 EXTR 50 TO RHT	514.80 514.80 514.80	606.10 606.10 606.10	1301.65 1301.65 1301.65	EXPAND TO EXHAUST 5024200.4 480036.8 4544163.6
BEFORE LO 37_ENTRY	0.08	0.	1524.43	REHEATER 1
	475.00	1006.20	1524.39	4546814.1 PCTDP = 7.731
51 ENTRY 125 ENTRY	465.50 481.83		1524.01 1418.32	
52 SHELL 53 EXTR	211.53 209.20	0. 806.40		EXP TO STG 11 4354229.8 208728.4
				PACKING NO 3
57 LO NO 1	16.76	634.10	1351.60	SQRT P/V = 4.266 1705.0 C = 1135.963
58 LO NO 2	16.77	646.40	1357.56	SQRT P/V = 0.657 1911.6 C = 4777.700
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.654 614.5 C = 1879.144
100 LO NO 4	0.	0.	0.	SQRT P/V = 0. 614.5 C = 1879.144

TL	PRESS	TEMP	ENTH	FLOW		
56 EXH 55 EXTR 59 ENTRY		626.10	1341.91	3898551.2 450833.0	PAND TO EXH	
61 SHELL 60 EXTR	59.41 58.70	0. 531.10	1282.79 1298.56	3776321.7	EXP TO STG	15
63 SHELL 62 EXTR				5526672.8 249649.0		16
65 SHELL 64 EXTR	10.40 10.45	o. 242.30	1145.74 1166.43	3400059.5 126613.3	EXP TO STG	18
107 SHELL 106 EXTR		o. o.	1092.98 1092.40	3296858.8		19
108 TB E 76 ENTRY 122 DRAI	0.	119.54 0. 0.	1045.4450 0. 0.		CONDENSER SHAFT LEVL = -36:	1 24.8
					SENERATOR SHAFT	1
MEASURED SHAFT 1	LOAD = 7859 KW = 79709		PF = 1.0 FL =4353.		= 64.00 = 6758.0	

## PERFORMANCE

# TRUNKLINE OUTPUT

TL	P	Т	Н	Q	SV	SP	PV	TR
1	2679.9	540.5	535.0	5573373.	0.0210	0.	0.	-3094.5
2	955.0	771.4	1374.5	500223.	0.7004	539.024	-1.476	232.4
3	955.0			500223.		0.	6.200	0.
4	2679.9	469.2	452.8	5573373.	O.,	0.	0.	0.
5	503.0			480037.	1.1586	467.626	-1.574	137.5
6	503.0			980260.		0.	7.800	
7	2679.9			5573373.	0.	0.	٥.	
5				208728.	3.5676	0. 384.983	-2.217	420.1
	207.7	344.7	316.3	1188988.	0.0179	0.	6.900	0.
	2826.3			5573373.			0.	0.
	0.	^	^	EE97970	0	0	^	0.
	107.3	622-4	1340.3	252175:	5.9163	332.958	257.400	
13		290.1	259 A	4086605	0.0174	0.	0.	0.
14			259.7	4086606	0.0174	1.014		161.8
	57.6	510 1	1797 8	122229	0.01,7	290 101	0.001	229.0
16		243 1	232.0	122229.	0.0171	0.	4.100	
		250 0	222.0	4086606.		0.	0.	0.
18		418.0				258.473		159.5
19							B. 600	
	161.8		140.0	4086606.	0.0166	0.	0.	
	10.0					193.445		44.2
22							7.100	
		156.6	101.7	470472.	0.0164	٥.	0.	
	1500.0	130.0	740 0	4086606.	0.	0.		0.
24	4.4	2/0.7				0.	0. 0.446	0.
	206.7			103201.		157.046		
					0.0162		٥.	0.
27		٥.	v.	4196167.		0.	0.	0.
28	0.	0	0.	18171.		0.	0.	0.
29		0.	0.	45255.	0.	0.	0.	0.
30	0.	0.	O	63426.	0.	0.	0.	0.
	2833.0		278.5				٥.	0.
33	0.	0.		4196167.		0.	0.	0.
34	0.	0.	0.			0.	0.	٥.
			313.5	5573373.	0.0176		0.	0.
		1001.5	1462.1	5570279.	0.3228	1462.094		
		890.0	1462.1		1.6419			55.6
		0.				0.		
	2393.8			5565491.			86.110	٥.
		912.2	1428.5	5515140.	0.4272	143.173		0.
41	975.8			4998137.	0.6855	542.134		841.6
42	112.4			12405.		0.779		0.0
43	16.8		1369.3	3761.	39.8733	0.	0.650	1005.0
45	0.	0.	0.	34207.	0.	0.	0.	0.
46			1325.2	4438.			4.482	
47	16.8		1321.8	3092.		٥.	0.678	827.0
48	0.	Ο.		5032344.		0.	0.	0.
49	514.8	606.1	1301.7	5024200.	1.1309	470.025	21.336	0.
50	514.8	606.1	1301.7	4544164.	0.	٥.	O.	0.
51	465.5	1005.0	1524.0	4562958.	1.8358	0.	15.928	0.

TL	P	Т	Н	Q	SV	SP	PV	TR
52	211.5	0.	1419.4	4354230.	3.4608	386.937	7.818	783.1
53	209.2	804.4	1478 4	208728	3.5455	385.592	PV 7.818 7.681	0.
54		622.9	1700 =	4740704	5.9080	0.	4.266	0
			1340.3	*******	J. 7000		A	~
55		626.1	1341.9	450833.	5.7472	335.322	0.	0.
56	107.5	622.9	1340.5	3898551.	5,9080	333.095	O.	ο.
57	16.8	634.1	1351.6	1705.	38.7868	0.	0.657	1136.0
58	16.8	646.4	1357.6	1912.	39.2031	٥.	0.654	4777.7
59		622.9	1340.5	3898551	5, 9080	o.	4.266	0.
60		531.1	1700 4	177770	9.9384	291 284	2.430	0.
		0.	1202 0	and the second s	9.5024		2.500	
62		426.5			14.6044	260.557	1.565	·
63		o.			14.0353		1.607	
64	10.5	242.3			39.6572		0.513	
65	10.6	o.	1145.7	3400059.	36.6907	196.413	0.537	1051.2
66	16.5	624.4	1346.9	9415.	39.0946	0.	٥.	0.
67		335.8	1190-1	0.	4.1644	0-	o. o.	0.
<u> </u>		480.0	1770 1	Ŏ.	274 2014	ō.	Ŏ.	0
		/7/ 1	47774	750	140 0754	Ŏ	Ŏ.	0.
	4.5	0/0.1	13/2./	/30.	140.0734	0.	0.	٥.
	4.5	6/6.1	13/2./	3191.	148.8754	O.	o.	0.
71	o.	0.	1462.1	O.	0.	٥.	o. o.	· O.
72	0.	٥.	0.	257.	0.	٥.	Ο.	0.
73	0.	o.	0.	-3625.	0.	0.	0.	0.
75	0.	0.	0.	5728.	0.	0.	0.	0.
	o.	O.	0	895483	0	0.	0.	0.
79	0/4 0	ات (بارس برة	4778 /	EAAAAX	O 4074	E40 0E1	0. 37.303	o.
	704.0	112=4	10/4.0	300223.	O.O734	740.271	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	O.
80	314.8	500 · I	1301./	48003/.	U.	U.	0.	O.
81	16.5	624.4	1346.9	, O.	39.0946	0.	٥.	0.
82	o.		ο.	4544164.	0.	0.	0. 0. 16.249	0.
83	107.3	333.0	1188.4	273.	0. 1.7990	0.	0.	٥.
84	475.0	1006.2	1524.4	4546814.	1.7990	7.731	16.249	799.0
86	0.	0-	0-	109561.	0	0.	0.	0.
	ŏ.	0	0	3191.	0	Ŏ.	0	Ô
90	4 25 23 25 ~ "	₹₹₹ **	70# 1	21/11	0.0179	0	0.	0.
	10/+0	JUJAL	204.1	~	0.01/6	0.	٥.	4 77 4 77
91	101./	237.3	200.1	401000-	0.0107	V.04/	V.	131./
75	1.7	119.5	1036.9	3296859.	190.3695	1045.445	0. 0. 0. 3.403	522.6
99	O.	0.	0.	6760.	0.	٥.		0.
100	0.	0.	0.	615.	0.	Q.	0.	1879.1
104	2679.9	540.5	535.0	5578025.	0.0210	1.028	0.	2679.9
106	4.5	0.			78.1635			0.
107	4.5	0.			77.3689			1124.0
108	1.7	119.5			205.7008			-3624.8
100	0.			2150541.				0.
111	107.3	333.1			4.1459		-0.142	
112	0.	0.		50351.	0.	0.	0.	o.
113	U.	0.		5498360.	0.		0.115E 19	
114	434.6	125.1	94.2	14857.	0.0162	0.624	O.	434.6
115	434.6	125.1	94.2	8663.	0.0162	0.624	0.	434.6
116	434.6	125.1	94.2	27616.	0.0162	0.623	٥.	434.6
117	434.6	125.1	94.2	15126.	0.0162		0.	434.6
	434.6		0/1 7	21097.	0.0162	0.660	o.	434.6
	434.6	125.1	04 7	22202.	0.0162	0.660	ŏ.	434.6
		120.1						
120	0.	0.		4788.	0.	٥.	0.	0.
122	0.	0.		4196167.	O.	0.	o.	0.
123	4.4	131.1	99.1	604883.	0.0163		4.700	٥.
125	481.8	808.0	1418.3	16144.	1.5086	0.628	0.	469.5
	0.		0.		0.	0.	0.	0.
131	108.3		1340.2		5.8608	1.018		108.3
132	108.5			109621.		1.019		108.5
133	0.	0.	0.			0.	o.	0.
201	0.1	Ο.	1524.4	0.	0.	222.775	O.	О.

A05-B

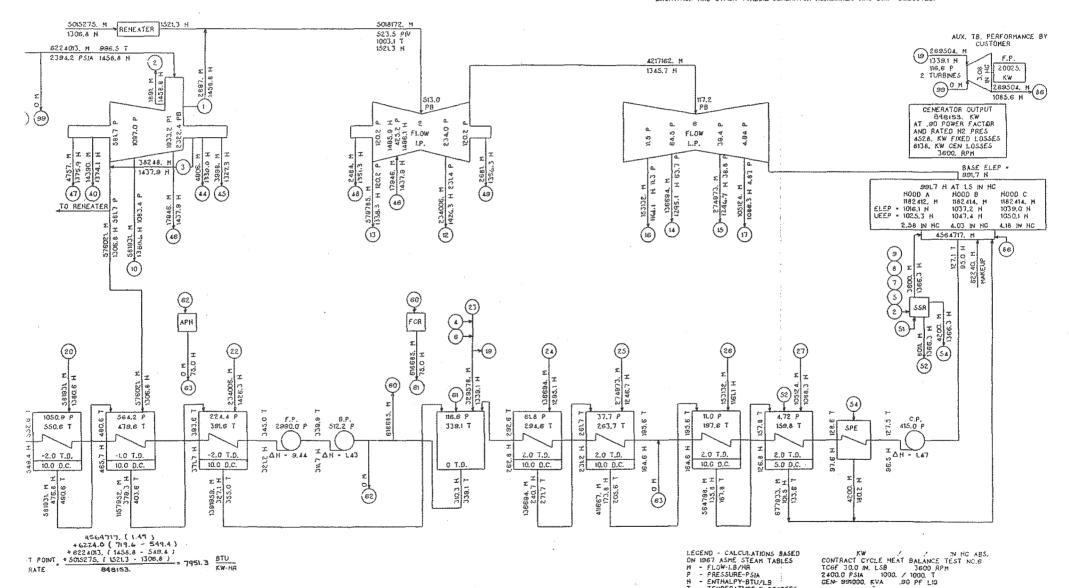
#### TURBINE AND EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

#### CALCULATED DATA - NOT CUARANTEED

T - TEMPERATURE-F DEGREES

9613T 1 0 1

RATING FLOW IS \$983948. H AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DEJION FLOW (RATING FLOW PLUS S.O PERCENT) OF 6262143. H
THE EQUIVALENT DESIGN FLOW AT 2394.2 PSIA AND 996.5 T IS 8223999. H
THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.

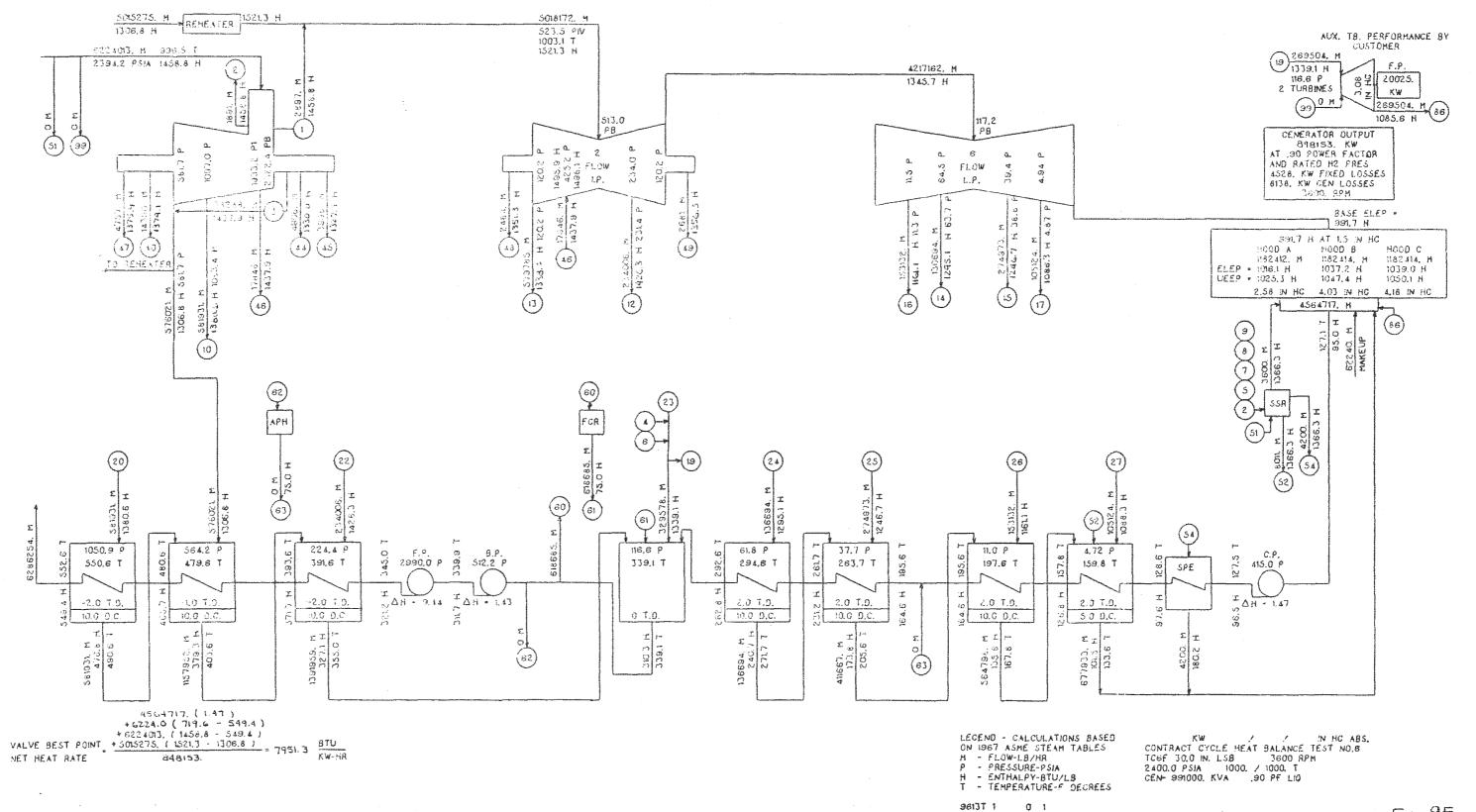


CUNTRACT CYCLE HEAT BALANCE TEST No. 6

F16.9E 5/14/87

#### CALCULATED DATA - NOT GUARANTEED

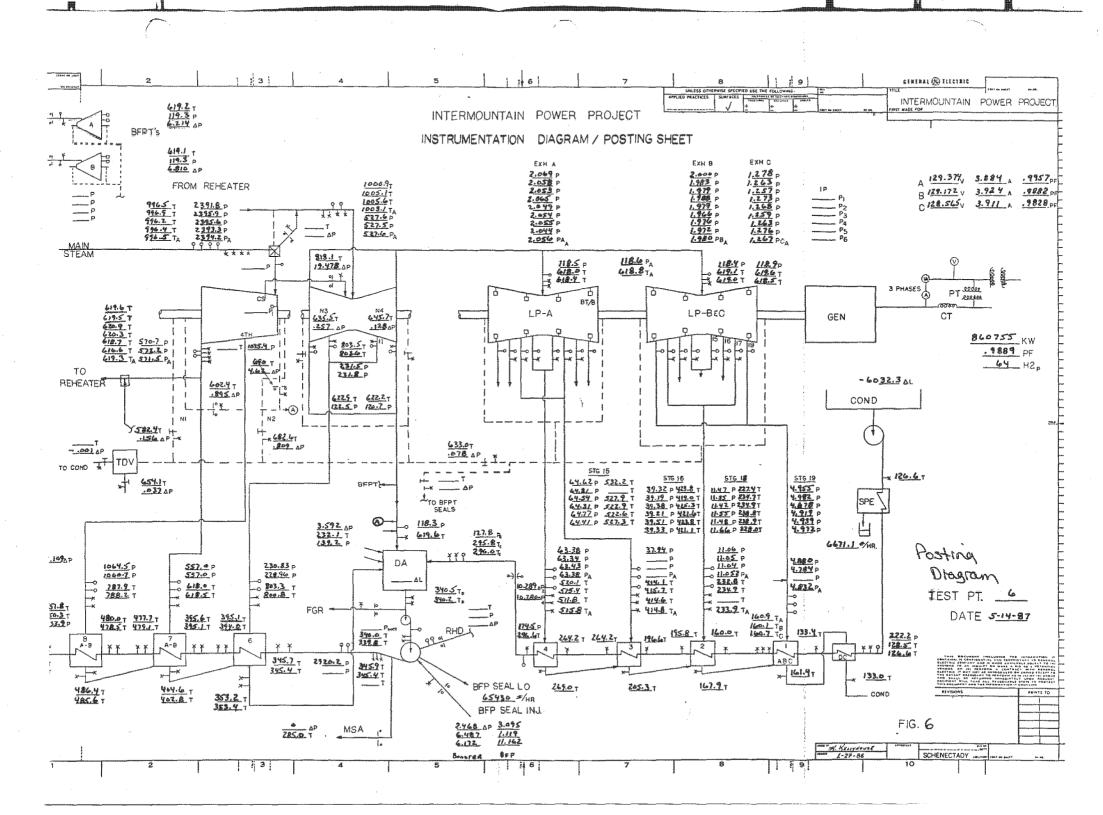
RATING FLOW IS 5963946, M. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES. SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW. THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW IRATING FLOW PLUS SO PERCENTI OF 6262143. M
THE EQUIVALENT DESIGN FLOW AT 2394.2 PSIA AND 996.5 T IS 622399. M.
THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR
EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.

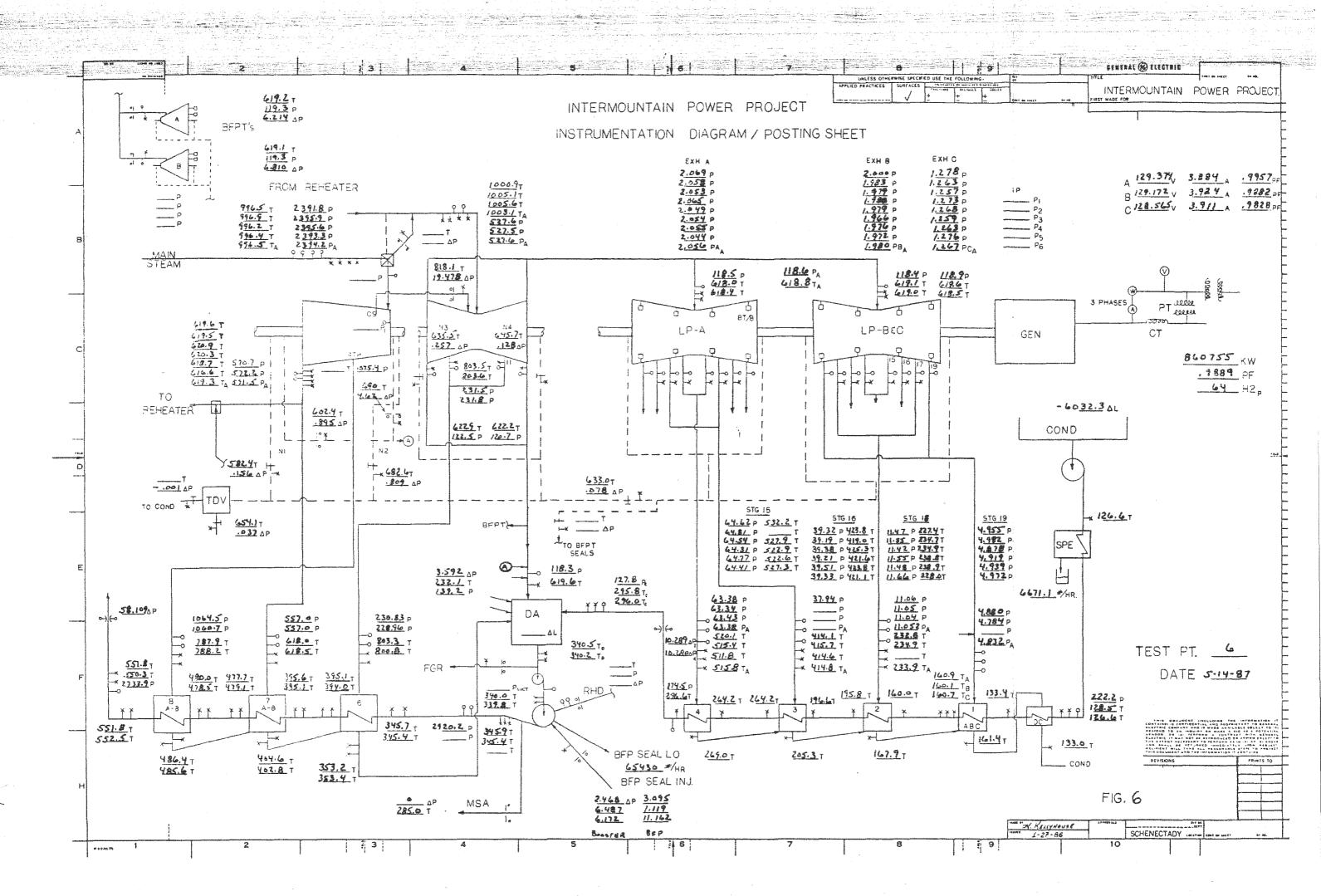


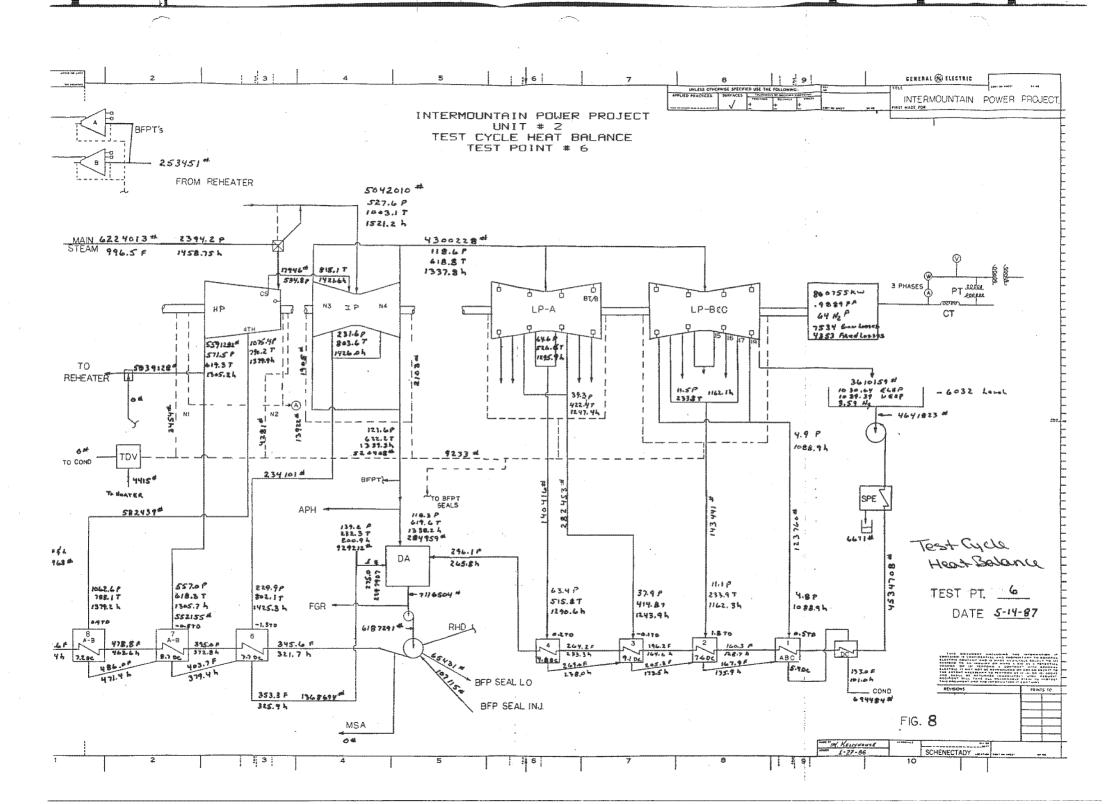
CONTRACT CYCLE HEAT BALANCE TEST No.6

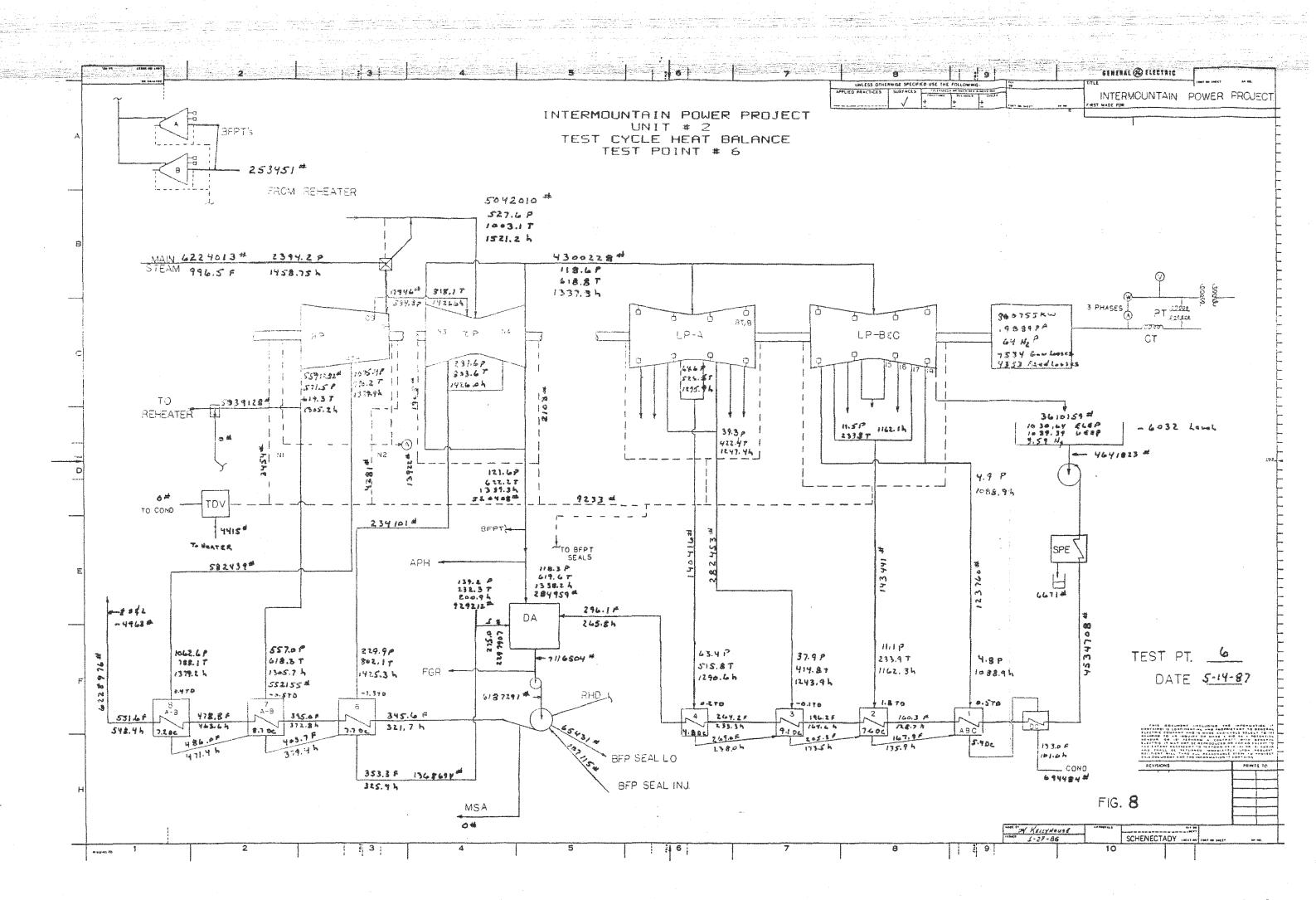
CENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

FIG. 9E









VALVE PGINT VWG 05/14/87 TEST PGINT 06
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC4F-30 IN LSB TURBINE NG 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

### CALCULATED USING ASME STEAM TABLES

### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 860755. 859887. HEAT RATE 7847.1 7855.0 THROTTLE FLOW 6224013. 6269949.

## TURBINE THERMAL PERFORMANCE

	HIGH PR	ESS TB	REHEAT TB				
			IP TB		1	LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH	
PRESS	2394.20	571.50	527.60	118.60		3.599	
TEMP	996.50	619.30	1002.45	618.80	)	121.56	
ENTH	1458.75	1305.18	1520.83	1337.76	•	1031.30	
ENTR	1.5320		1.7317	1.747E	}		
EFF	88.	.016	91.464		93.	775	
ABSCISSA	PHPX/PT=0.23	387	P1STSTG/PT=0.8050	)	VAN=	539.1	

## THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

	TOTAL TB ENE		LP TB ENERG	
	RHT TB	LP TB	RHT TB	LP TB
AE	522.03	329.59		
H ELEP	1031.30		1031.30	
H UEEP	1039.33		1039.33	
EFF ELEP	93.77	92.98	93.77	92.98
EFF UEEP	92.24	90.54	92.24	90.54
VAN	539.15		539.15	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A06-1

# T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB		LP TB
H ELEF	1033.75		1033.75	
H UEEP	1041.79		1041.79	
EFF ELEP	93.31	72.24	93.31	92.24
EFF UEEP	91.77	89.80	91.77	89.80
VAN	540.55		540.55	

# STAGE FLOW FUNCTION

STE		VEL HD	PCT DELTA	P PRESS	•	Q/AP H FLG	QFS	Q/AP H SHL
1	1927.30	0.	0.	0.	86.6	0.	6162994.	1003.8
4	1088.87	4.278	1.24	1075.40	157.4	848.2	5561745.	842.9
RH 1	527.60	0.	0.	0.	350.2	0.	5041928.	795.B
8	517.05	0.	0.	0.	350.2	0.	5059875.	814.8
11	234.23	0.822	1.12	231.60	711.2	791.8	4825774.	781.3
15	118.60	0.	0.	0.	807.6	0.	4300146.	1128.2
15	65.42	0.291	1.29	64.58	1414.8	1089.3	4159730.	1063.0
16	39.88	0.190	1.39	39.33	2021.4	1103.3	3877277.	1079.3
18	11.69	0.059	1.45	11.52	6018.0	1081.0	3733837.	1044.3
19	5.01	0.022	1.26	4.94	12096.0	1126.0	3610182.	1118.8

TL	PRESS	TEMP	ENTH	FLOW	
•	FEEDW	ATER	CYCLE		
					ATER
4 FW IN	2733.90	478.80	463.56	6228975.6	CLOSED
2 EXTR	1062.60	788.10	1379.22	582439.2	TD =
3 DRAIN	1042.40	486.00	471.41	582439.2	DC =
				HE	ATER
7 FW IN	2733.90	395.00	372.85	6228975.6	CLOSED
5 EXTR	557.00	618.30	1305.74	552154.5	TD =
6 DRAIN	557.00	403.70	379.43	1134593.8	DC =
3 ENTRY	1062.60	486.00	471.41	582439.2	

2	FW IN EXTR DRAIN		788.10		6228975.6 582439.2 582439.2	TD =	0.4 7.2
	FW IN	2733.90	395.00		6228975.6		7
6			403.70	379.43	552154.5 1134593.8 582439.2		-0.5 8.7
						ATER	6
8 9		229.90	802.10	325.37	234100.5 1368694.3	TD =	-1.3 7.7
_						UMF	
86 30 32 24	LEAKAGE EXTR	o. o.		0. 0. 0. 191.49	6187291.2 107115.2 65430.7 0.	٠	
					HE	ATER	5
					4534707.4	OPEN	
12 111	FW IN EXTR DRAIN ENTRY	118.30	619.60	1338.18		OPEN STO =	769.6
12 111 109	EXTR DRAIN ENTRY	118.30 118.30 0.	619.60 340.40 0.	1338.18 311.68 275.04	4534707.4 284958.8 7116503.7 2297906.8	OPEN STO = SC =	769.6
12 111 109	EXTR DRAIN ENTRY	118.30 118.30 0.	619.60 340.40 0.	1338.18 311.68 275.04	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8	OPEN STO = SC =  ATER CLOSED	769.6 -0.2
12 111 109 17 15	EXTR DRAIN ENTRY	118.30 118.30 0.	619.60 340.40 0.	1338.18 311.68 275.04 233.31 1290.64	4534707.4 284958.8 7116503.7 2297906.8	OPEN STO = SC =  ATER CLOSED TD =	769.6 -0.2
12 111 109 17 15	EXTR DRAIN ENTRY  FW IN EXTR	118.30 118.30 0. 174.50 63.38 63.38	619.60 340.40 0. 264.20 515.80 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3	OPEN STO = SC =  ATER CLOSED TD = DC = ATER	769.6 -0.2 4 0.2
12 111 109 17 15 16	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN	118.30 118.30 0. 174.50 63.38 63.38	619.60 340.40 0. 264.20 515.80 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3	OPEN STO = SC =  ATER CLOSED TD = DC = ATER CLOSED	769.6 -0.2 4 0.2 4.8
12 111 109 17 15 16	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR	118.30 118.30 0. 174.50 63.38 63.38	619.60 340.40 0. 264.20 515.80 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3 HE 4534707.8 282452.6	OPEN STO = SC =  ATER CLOSED TD = DC = ATER CLOSED TD =	769.6 -0.2 4 0.2 4.8 3
12 111 109 17 15 16 20 18 19	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN	118.30 118.30 0. 174.50 63.38 63.38	619.60 340.40 0. 264.20 515.80 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3	OPEN STO = SC =  ATER CLOSED TD = DC = ATER CLOSED	769.6 -0.2 4 0.2 4.8
12 111 109 17 15 16 20 18 19 16	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN  EXTR DRAIN ENTRY	118.30 118.30 0. 174.50 63.38 63.38 174.50 37.94 53.38	619.60 340.40 0. 264.20 515.80 269.00 196.20 414.80 205.30 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97 164.64 1243.90 173.48 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3 HE 4534707.8 282452.6 422868.9 140416.3	OPEN STO = SC =  ATER CLOSED TD = DC = ATER CLOSED TD =	769.6 -0.2 4 0.2 4.8 3
12 111 109 17 15 16 20 18 19 16	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN	118.30 118.30 0. 174.50 63.38 63.38 174.50 37.94 63.38	619.60 340.40 0. 264.20 515.80 269.00 196.20 414.80 205.30 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97 164.64 1243.90 173.48 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3 HE 4534707.8 282452.6 422868.9 140416.3 HE 4534707.8	OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = CLOSED	769.6 -0.2 4 0.2 4.8 3 -0.1 9.1
12 111 109 17 15 16 20 18 19 16	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN EXTR	118.30 118.30 0. 174.50 63.38 63.38 174.50 37.94 63.38	619.60 340.40 0. 264.20 515.80 269.00 196.20 414.80 205.30 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97 164.64 1243.90 173.48 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3 140416.3 HE 4534707.8 282452.6 422868.9 140416.3 HE 4534707.8 143440.6	OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = TD = TD =	769.6 -0.2 4 0.2 4.8 3 -0.1 9.1
12 111 109 17 15 16 20 18 19 16 23 21 22	EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN	118.30 118.30 0. 174.50 63.38 63.38 174.50 37.94 63.38	619.60 340.40 0. 264.20 515.80 269.00 196.20 414.80 205.30 269.00	1338.18 311.68 275.04 233.31 1290.64 237.97 164.64 1243.90 173.48 237.97	4534707.4 284958.8 7116503.7 2297906.8 HE 4534707.8 140416.3 140416.3 HE 4534707.8 282452.6 422868.9 140416.3 HE 4534707.8	OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = TD = TD =	769.6 -0.2 4 0.2 4.8 3 -0.1 9.1

STM SEAL REG TO TOV		-		FRESS	TEMP	ENTH	FLOW	
26 FW IN 222.20 127.60 96.11 4534707.8 CLOSED 25 EXTR 4.83 0. 1088.93 123654.9 TD = 0.5 123 DRAIN 4.83 133.00 100.96 694461.4 DC = 5.4 22 ENTRY 11.05 167.90 135.88 566309.5 70 ENTRY 5.03 654.10 1361.97 4497.0 PUMP 33 FW IN 0. 0. 0. 0. 4641822.9 FW DUT 0. 0. 0. 0. 4641822.9 FW TO BOILER 1 FW IN 2733.90 551.60 548.44 6228975.6 S+L = -4963.  T U R B I N E E X P A N S I O N MAIN STEAM LINE 2394.20 996.50 1458.75 6224012.6 VALVE STEM LKG 4280.9 C = 55.449	70	TDV TDV		5.03 2.12	654.10 480.00	1361.97 1279.06	4497.0 4497.0 0.	CALCULATED TO HEATER
33 FW IN 0. 0. 0. 0. 4641822.9 87 LEAKAGE 0. 0. 0. 0. 4641822.9 27 FW OUT 0. 0. 0. 0. 4641822.9  FW TO BOILER  1 FW IN 2733.90 551.60 548.44 6228975.6 S+L = -4963.  T U R B I N E E X P A N S I D N  MAIN STEAM LINE 1 EXIT 0. 0. 1458.75 6224012.6  VALVE STEM LKG  SQRT P/V = 86.356 37 LO NO 1 527.80 887.33 1458.75 2800.9 C = 55.449  38 LO NO 2 0. 0. 0. 1434.28 SQRT P/V = 18.949 38 LO NO 2 0. 0. 1434.28 6162994.1 112 EXTR 0. 0. 1434.28 6162994.1 112 EXTR 0. 0. 1434.28 56230.2  PACKING NO 2  42 LO NO 1 123.45 690.00 1373.33 13722.1 C = 0.000  43 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 4.750 4281.1 C = 1028.969	25 123 22	EXTR DRAIN ENTRY		4.83 4.83 11.05	0. 133.00 167.90	1088.93 100.96 135.88	4534707.8 123654.9 694461.4 566309.5	CLOSED TD = 0.5 DC = 5.4
TURBINE EXPANSION  TURBINE EXPANSION  MAIN STEAM LINE  71 EXIT 36 THROTTLE 2394.20 996.50 1458.75 0.  VALVE STEM LKG  VALVE STEM LKG  VALVE STEM LKG  SQRT P/V = 86.356 2800.9 C = 55.449  38 LO NO 2 O. 0. 0. 0. 1434.28 SQRT P/V = 18.949 1787.5 C = 104.887  40 SHELL 1927.30 934.00 1434.28 6162974.1 112 EXTR 0. 0. 123.45 690.00 1373.33 SQRT P/V = .115E 19 42 LO NO 1 123.45 690.00 1373.33 SQRT P/V = .115E 19 43 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 4.750 4281.1 C = 1028.969	87	LEAKA	GE	0.	Ο.	0.	4641822.9 0.	-
TURBINE EXPANSION  MAIN STEAM LINE O. O. 1458.75 O. 36 THROTTLE 2394.20 996.50 1458.75 O. 37 LO NO 1 527.80 887.33 1458.75 2800.9 C = 55.449  38 LO NO 2 O. O. O. SQRT P/V = 18.949 38 LO NO 2 O. O. 1434.28 6162994.1 112 EXTR O. O. 1434.28 6162994.1 112 EXTR O. O. 1434.28 56230.2  PACKING NO 2 42 LO NO 1 123.45 690.00 1373.33 SQRT P/V = .115E 19 42 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 4.750 43 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 0.655							FV	V TO BOILER
MAIN STEAM LINE 71 EXIT	4	FW IN		2733.90	551.60	548.44	6228975.6	S+L = -4963.
71 EXIT 0. 0. 1458.75 0. 4224012.6  VALVE STEM LKG  VALVE STEM LKG  VALVE STEM LKG  VALVE STEM LKG  SCRT P/V = 86.356 2800.9 C = 55.449  38 LO NO 2 0. 0. 0. 9. 1987.5 C = 104.887  40 SHELL 1927.30 0. 0. 1434.28 6162994.1 56230.2  PACKING NO 2  42 LO NO 1 123.45 690.00 1373.33 13922.1 C = 0.000  43 LO NO 2 17.08 682.60 1375.18 SCRT P/V = 4.750 4281.1 C = 1028.969				Т	URBIN	EEXPA	NOICN	
SQRT P/V = 86.356 37 LO NO 1 527.80 887.33 1458.75 2800.9 C = 55.449  38 LO NO 2 O. O. O. SQRT P/V = 18.949 1987.5 C = 104.887  40 SHELL 1927.30 934.00 1434.28 6162994.1 112 EXTR O. O. 1434.28 56230.2  PACKING NO 2  42 LO NO 1 123.45 690.00 1373.33 SQRT P/V = 115E 19 42 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 4.750 43 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 0.655							0.	AIN STEAM LINE
37 LO NO 1 527.80 887.33 1458.75 2800.9 C = 55.449  38 LO NO 2 0. O. O. O. SQRT P/V = 18.949  40 SHELL 1927.30 934.00 1434.28 6162994.1 112 EXTR O. O. 1434.28 6162994.1 56230.2  PACKING NO 2  42 LO NO 1 123.45 690.00 1373.33 13922.1 C = 0.000  43 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 4.750  42 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 0.655							V	ALVE STEM LKG
38 LO NO 2 O. O. O. 1987.5 C = 104.887  40 SHELL 1927.30	37	LO NO	1	527.80	887.33	1458.75		
EXP TO STG 1 40 SHELL 1927.30 934.00 1434.28 6162994.1 112 EXTR 0. 0. 1434.28 56230.2  PACKING NO 2  42 LO NO 1 123.45 690.00 1373.33 13922.1 C = 0.000  43 LO NO 2 17.08 682.60 1375.18 SQRT P/V = 4.750 42 LO NO 2 0.655	38	LO NO	2	0.	0.	0.		
SQRT P/V = 115E 19 42 LO NO 1 123.45 690.00 1373.33 13922.1 C = 0.000  SQRT P/V = 4.750 43 LO NO 2 17.08 682.60 1375.18 4281.1 C = 1028.969  SQRT P/V = 0.655	40 112	SHELL EXTR	-	1927.30 O.	934.00 0.	1434.28	6162994.1	
42 LO NO 1 123.45 690.00 1373.33 13922.1 C = 0.000  SQRT P/V = 4.750  43 LO NO 2 17.08 682.60 1375.18 4281.1 C = 1028.969  SQRT P/V = 0.655							PAC	CKING NO 2
43 LO NO 2 17.08 682.60 1375.18 4281.1 C = 1028.969  SQRT P/V = 0.655	42	LO NO	1	123.45	690.00	1373.33		
	43	LO NO	2		682.60	1375.18		
	100	LO NO	3	٥.	0.	0.		

A06-4

TL	PRESS	TEMP	ENTH	FLOW
41 SHELL 79 EXTR	1088.87 1075.40	0. 790.20	1379.87 1379.87	EXP TO STG 4 5561745.3 582439.2
				PACKING NO 1
46 LO NO	1 122.05	602.40	1329.31	SQRT P/V = 23.609 4686.3 C = 370.502
47 LO NO	2 16.96	582.40	1326.61	SQRT P/V = 4.898 3454.4 C = 829.131
100 LO NO	з о.	0.	0.	SQRT P/V = 0.682 606.4 C = 1834.023
80 EXTR	571.50	619.30	1305.18	EXPAND TO EXHAUST 5591282.1 552154.5 5039127.5
BEFORE L	0 0.08	0.	1521.22	REHEATER 1
37 ENTRY 84 AFTER L	0 527.60	1003.10	1521.18	5041928.4 PCTDP = 7.682
51 ENTRY 125 ENTRY				
				EXP TO STG 11 4825774.3 234100.5
				PACKING NO 3
57 LO NO	1 16.95	635.50	1352.26	SQRT P/V = 4.719 1904.7 C = 1106.108
58 LO NO :	2 16.95	645.70	1357.21	SQRT P/V = 0.664 2102.6 C = 4990.290
100 LD NO :	3 O.	0.	0.	SQRT P/V = 0.661 606.4 C = 1834.023
100 LO NO -	4 0.	0.	0.	SQRT P/V = 0. 606.4 C = 1834.023

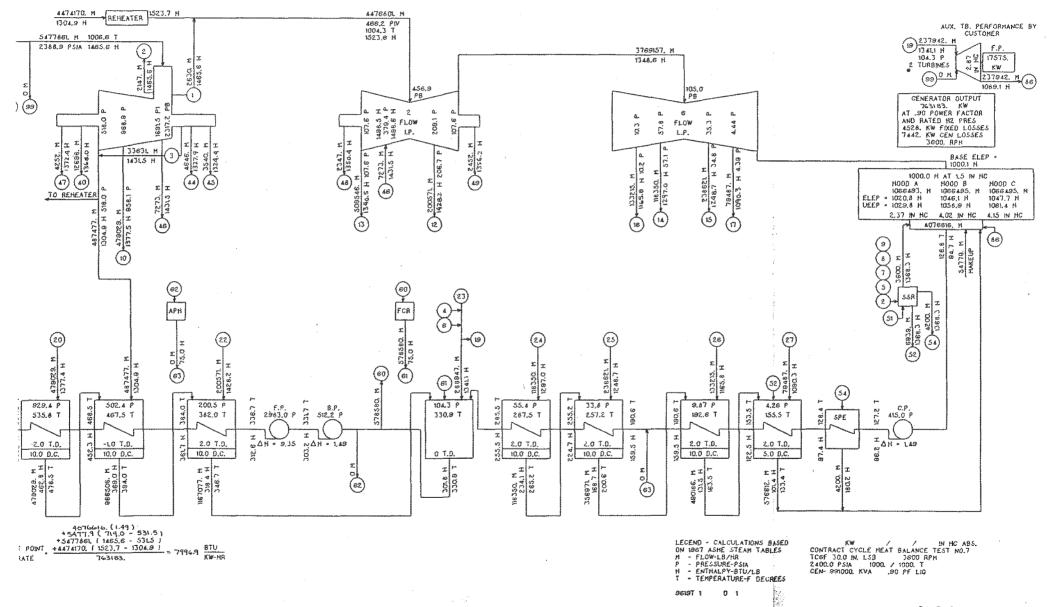
TL	PRESS	TEMP	ENTH	FLOW		
56 EXH 55 EXTR			1337.76 1339.27			ST
59 ENTRY	118.60	618.80	1337.76		EXPAND TO BOW 2	
61 SHELL 60 EXTR	65.42 64.58		1278.95 1295.85	4159729.		15
63 SHELL 62 EXTR	39.88 39.33		1234.56 1247.42			16
65 SHELL 64 EXTR			1142.71 1162.06			18
107 SHELL 106 EXTR	5.01 4.94	o. o.	1089.63 1088.93			19
TL	PRESS	TEMP	ENTH	FLOW		
108 TB EXH 76 ENTRY 122 DRAIN	1.77 0. 0.	121.56 1 0. 0.	1039.3263 0. 0.	3610181.0 1025609.2 4641823.3		.3
					GENERATOR SHAFT	1
MEASURED LOA SHAFT 1 KW			PF = 0.98 FL =4353.0		= 64.00 = 7534.3	

# PERFORMANCE

# TRUNKLINE OUTPUT

TI	P	Т	u	Q	SV	SP	PV	TR
	2733.9	551 A	54R 4	422897A	0.0212	٥.		-4963.0
	1062.6	788.1		582439.		552.001		
	1062.6			582439.			7.200	0.
	2733.9			6228976.			Ω	0.1
5		618.3				478.275	-0.525	140.0
6				1134594.		0.	8.700	٥.
	2733.9			6228976.		o.	^	^
8		802.1		234101.		393.660	-1.340	408.4
	229.9	353.3	325.4	1368694.	0.0180	0.	7.700	0.
	2908.2	345.6	321.7	6228976.	0.0180 0.0177	0.	0.	0.
11		0.	0.	6187291.	0.	0.	0.	0.
12		619.6	1338.2	284959.	5.3428	340.195	0. 769.600 0.	279.4
13		296.1	265.8	4534707.	0.0174	0.	٥.	0.
14		296.1	265.9	4534708.	0.0174	1.014	0.	174.5
15		515.8	1290.6	140416.	9.0467	296.309	0.209	219.5
16		269.0	238.0	140416.	0.0172	0.	4.800	0.
17		264.2	233.3	4534708.	Ö.	٥.	٥.	0.
18		414.8	1243.9	282453.	13.5611	264.072	-0.128	150.7
19					0.0167			0.
20				4534708.			0.	0.
21		233.9	1162.3	143441.	37.0078	197.975	1.775	35.9
22		167.9	135.9	566310.	0.0164	0.	7.600	0.
23		160.3	128.7	4534708.	0.	0.	٥.	٥.
24	1500.0	220.2	191.7	0.	0.0167	0.	0.	0.
	4.8	o.				160.795	0.495	-160.8
26		127.6		4534708.			0.	0.
27	0.	0.	0.	4641823.	0.	0.	o.	٥.
28		0.	0.	18500.	0.	0.	0.	٥.
29		0.	0.	46930.	0.	0.	0.	0.
30	0.	0.	0.	65431.	0.	0.	0.	0.
31	2920.2	285.0	259.9	· O.	0.0171	0.	0.	0.
33	0.	0.	0.	4641823.	0.	0.	0.	0.
34	0.	0.	0	-4963.	0.	٥.	0.	0.
35	2908.2	345.6	321.7	6228976.	0.0177	0.	0.	0.
36	2394.2	996.5	1458.8	6224013.	0.3210	1458.752		
37	527.8	887.3	1458.8	2801.	1.4699	0.780	18.949	55.4
38		O.	0.	1988.	0.	0.	0.	104.9
	2394.2	٥.		6219224.	0.3210	0.	86.356	0.
	1927.3			6162994.				
	1088.9	٥.		5561745.	0.6196			
42			1373.3				4.750	
43				4281.	39.7595	0.	0.655	1029.0
45		o.	0.		0.	0.	0.	0.
46		602.4	1329.3		5.0881	0.703	4.898	
47			1326.6		36.5003	0.	0.682	829.1
48	0.	0.		5600029.	0.	0.	0.	0.
49		619.3		5591282.	1.0253		23.609	0.
50		619.3		5039128.	0.	0.	0.	٥.
51	517.0	1001.9	1520.8	5059875.	1.6450	0.	17.733	0.

TL	P	Т	Н	Q.	SV	SF	PV	TR
52	234.2	0.	1415.8	4825774	31054	395, 673	8.685	781.3
53					3.1892		8.522	
							4.719	
54		618.8					4.717	٥.
55		622.2			5.2086		0.	
56	118.6	618.8	1337.8	4300146.	5.3248	340.385	0.	0.
57	17.0	635.5	1352.3	1905.	38,4006	0.	0.664	1106.1
	17.0		1357 2	2103	38 7611	0	0.661	4990.3
59		618.8					4.719	
		526.6			8.9798		2.682	
							2.766	
62	39.3	422.4	1247.4	282453.	13.1955	266.231	1.726	0.
63	39.9	0.	1234.6	3877277.	12.6280	267.246	1.777	1079.3
		233.8					0.570	
		0.					0.594	
							0.	
67							0.	
86	2.1						٥.	.0.
69	5.0	654.1	1362.0	1533.	131.7884	0.	0.	0.
70	5.0				131.7884			0.
							0.	
	Ö.	~	270010	770	0.	^.	~ ·	ŏ.
							0.	
							0.	
					O.		0.	
79	1075.4	790.2	1379.9	582439.	0.6275	553.477	41.399	٥.
							0.	
D1	14 4	433 0	1751 1	^	70 1/5/	ŏ.	o.	Ŏ.
							0.	
83					0.		0.	
84					1.6120			795.8
86	0.	0.	0.	107115.	O.	٥.	0.	٥.
88	O.	0.	0.	4497.	0.	0.	0.	٥.
					0.0179			0.
91					0.0169		o.	
					179.3530			
	Ų.	o.	O.	66/1.	O.	. V.	0.	
100	Ο.	Ο.	Ο.	606.	0.	0.	0.	
					0.0212			2733.9
106	4.9	0.	1088.9	123655.	71.2111	161.752	0.263	0.
107					70.3504	0.	0.267	1118.8
						1039.326	3.599	-6032.3
					0.		0.	
111	110 7	770 1	744 7	7114504	7 7707	Ŏ.	-0.205	0.
111	110*0	340.4	311.7	/110004.	3.//7/	0.	-0.200	0.
					o.			٥.
113	0.	O.,	0.	6144185.	Ο.	0.	0.115E 19	Ο.
114	411.8	126.6	95.6	14773.	0.0162	0.624	О.	411.8
115	411.8	126.6	95.6	8886.	0.0162	0.624	0.	411.8
116	411.8	126.6	95.6	28048.	0.0162	0.623	0.	411.8
							0.	
							o.	
							O.	
120	Ο.	0.	0.	4788.	0.	0.	0.	
122	0.	0.	0.	4641823.	0.	0.	0.	٥.
123	4.8	133.0	101.0	694461.	0.0163	0.	· 5.400 0.	0.
					1.3659	0.628	0.	521.0
130	0.	0		254057	0	0-	0.	0
4 4.4	110 T	Z10 0	4 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1040EC	e anea	1 010	o.	110 7
101	117.0	017:2	100/.7	124208.	J. 27J2	1.017	O.,	117°3
152	117.7	017.1	133/.9	129800.	D. 2746	1.014	0.	117.7
133	0	Ο.	O.	253451.	0.	O.	0.	
201	0.1	0.	1521.2	0.	O.	216.039	0.	O.,

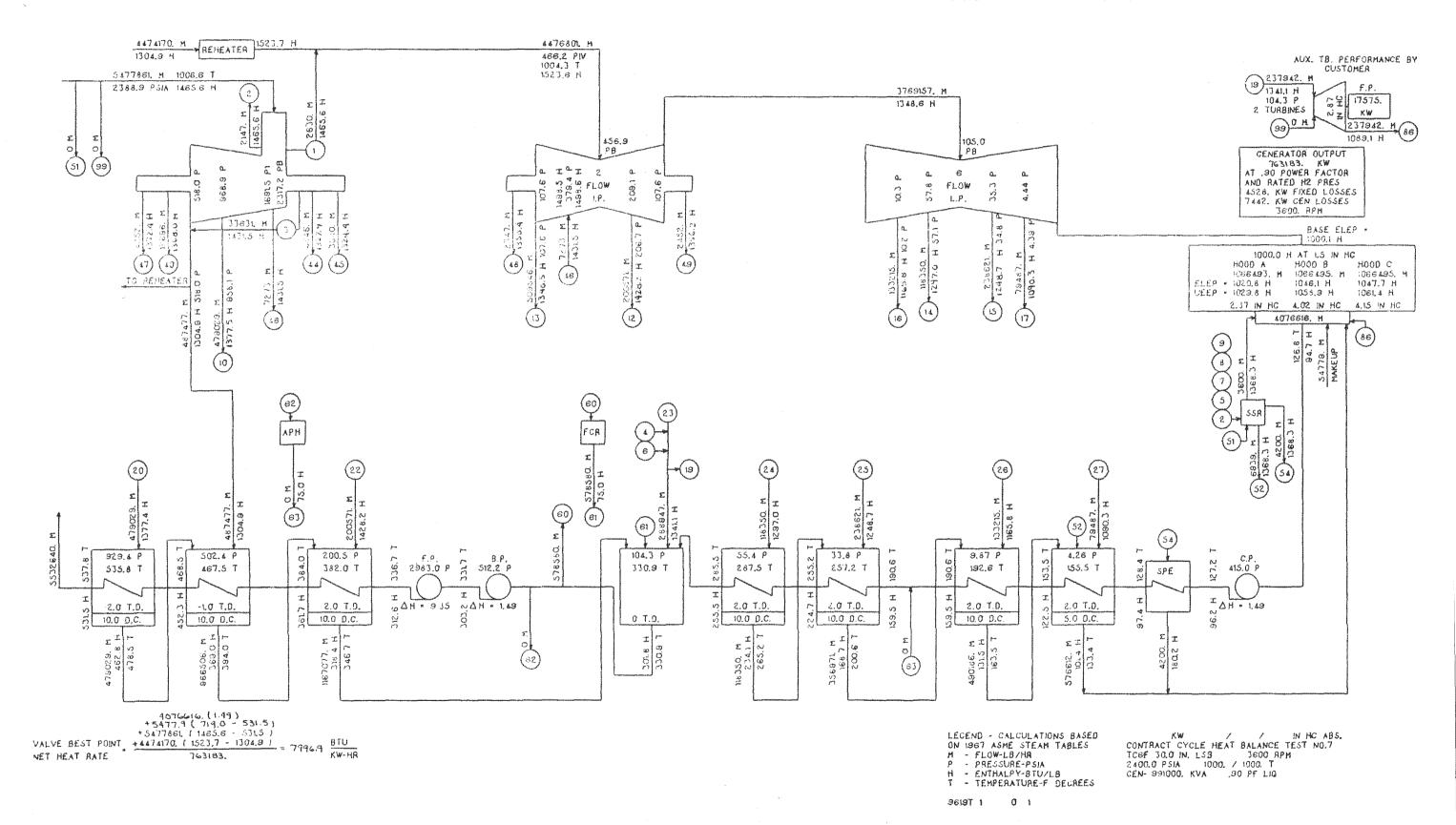


ERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

IP14\_004982

P-7 5/1W87 FIG. 9F

THE VALUE OF CEMERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



CENERAL ELECTRIC COMPANY, SCHENECTABY N.Y.

5/14/87 FIG. 9F

VALVE POINT 3RD VL 05/15/87 TEST POINT 07
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC6F-30 IN LSB TURBINE NO 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

## CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

	TEST CONDITIONS	*	RATED CONDITIONS
	8		
TOTAL LOAD	775096.		774305.
HEAT RATE	7864.3		7872.3
THROTTLE FLOW	5477861.		5561237.

## TURBINE THERMAL PERFORMANCE

•	HIGH PR	ESS TB	REHEAT TB			
			IP TB		L	P TB
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2388.90	507.00	467.60	106.10		3.513
TEMP	1006.60	607.30	1003.98	621.50		120.69
ENTH	1465.64	1303.04	1523.41	1339.91		1038.31
ENTR	1.5369		1.7465	1.7619		
E F	86.	. 221	91.796		93.7	57
ABSCISSA	PHPX/PT=0.2	122	P1STSTG/PT=0.70	74	VAN=	501.5

## THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

	TOTAL TB ENERGY	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	517.40	324.96		
H ELEP	1038.31		1038.31	
H UEEP	1047.45		1047.45	
EFF ELEP	93.76	92.81	93.76	92.81
EFF UEEP	71.77	90.00	91.99	90.00
VAN	501.48		501.48	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A07-1

	TOTAL TB ENER	GY BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1040.77		1040.77	
H UEEP	1049.89		1049.89	
EFF ELEP	93.28	92.05	73.2B	92.05
EFF UEEP	91.52	87.25	91.52	89.25
VAN	502.7B		502.78	

# STAGE FLOW FUNCTION

STO		ONE VEL HD	PCT DELTA	FLANS P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1689.80	0.	0.	0.	86.6	0.	5432148.	1006.2
4	962.48	3.391	1.11	951.80	157.4	847.5	4926550.	842.8
RH 1	467.60	0.	0.	0.	350.2	0.	4483722.	800.0
8	458.25	0.	0.	0.	350.2	٥.	4490995.	817.6
11	208.21	0.722	1.11	205.90	711.2	791.9	4284397.	781.9
15	106.10	0.	0.	o.	807.6	0.	3841718.	1129.2
15	58.58	0.239	1.18	57.89	1414.8	1090.5	3721658.	1064.9
16	35.72	0.160	1.30	35.26	2021.4	1106.9	3477102.	1083.4
18	10.46	0.049	1.36	10.32	6018.0	1092.0	3353727.	1047.6
19	4.51	0.015	0.95	4.46	12096.0	1125.1	3256836.	1119.8

=	_	F	$\mathbf{n}$	Li	Δ	T	F	R	C	v	$\Gamma$	1	_
ē	Same	lan-	5	ww	577		Sum	5.5	يبرا		- Tarant	Same	Bress

,						ATER	8
	FW IN	2669.20	467.90	451.40	5483310.6		
	EXTR	943.10	772.80		488974.9		-1.6
-3	DRAIN	943.10	473.B0	457.37	488974.9	DC =	5.9
					HE	ATER	7
7	FW IN	2669.20	385.90	363.19	5483310.6		•
	EXTR	495.90	606.20	1303.29	471082.7	TD =	-1.7
6	DRAIN	495.90	393.70	368.61	960057.6	DC =	7.8
3	ENTRY	943.10	473.80	457.37	488974.9		
					A 24	7 20 0000 0000 0004	
	(TOTAL )			colors as a state COOs		ATER	6
	FW IN	2754.40	336.30	311.83	5483310.6		
	EXTR	204.40		1426.81	206598.3		-2.3
	DRAIN	204.40	343.10		1166655.9	DC =	6.8
6	ENTRY	495.90	393.70	368.61	960057.6		
					P	UMP	
11	FW IN	0.	0.	٥.	5430703.8		
86	SEAL INJ	0.	0.	0.	117579.8		
	SEAL RET	0.	o.	o.	64973.0		
	LEAKAGE	o.	٠.	0.	0.		
	EXTR	1500.00	263.68	235.47	0.		
		2754.40	336.30	311.83			
	. , , , , , , , , , , , , , , , , , , ,		. 4	deter, terry date, erry mercy Allin,	diding in proper, sons, one had after one among		
					HE	ATER	5
13	FW IN	114.80	289.30	258.82	4016291.1	OPEN	
12	EXTR	105.80	621.30	1339.83	248542.4	STO =	514.9
111	DRAIN	105.80	332.00	302.89	6403041.8	SC =	-0.1
109	ENTRY	0.	0.	265.32	2138993.9		
						ATER	4
4 "7	FW IN	160.10	258.20	227.18			4
	EXTR	56.85	518.00	1292.30	120060.2		^ 4
		56.85					-0.1
10	DRAIN	36.83	262.30	231.14	120060.2	שנ =	4.1
					HE	ATER	3
20	FW IN	160.10	191.30	159.69	4016291.8	CLOSED	
18	EXTR	34.09	416.70	1245.33	244555.9	TD =	-0.5
19	DRAIN	34.09	199.80	167.94	364616.1	DC =	8.5
16	ENTRY	56.85	262.30	231.14	120060.2		
					g. 20 General	A TEET	grang
tent mile	good \$ g . b. t	110 10	45/ 40	404 /7		ATER	2
	FW IN	160.10	156.30	124.63	4016291.8		d e
	EXTR	9.93	237.10	1164.14	123375.0	•	1.6
	DRAIN	9.93	163.30	131.27		DC =	7.0
19	ENTRY	34.09	199.80	167.94	364616.1		

Т	Z Lane		PRESS	TEMP	ENTH	FLOW	
88 70 68	TDV TDV		4.50 2.08	653.00	1361.46 1279.07	2751.8 2751.8 0.	
25 123 22			4.40 4.40 9.93	0. 132.10 163.30	1090.98 100.06 131.27	HE 4016291.8 96890.9 587633.8 487991.1 2751.8	TD = 0.6
33 87 27	LEAK	AGE	o. o.	o. o.	0.	PI 4133871.6 0. 4133871.6	
						-	W TO BOILER
1	FW II	V	2669.20	539.10	533.32	5483310.6	S+L = -5449.
			т	URBIN	EEXP	NSION	
				0. 1006.60			AIN STEAM LINE
						V	ALVE STEM LKG
37	LO NO	4	467.80	896.16	1465.64		P/V = 85.690 C = 55.757
38	LO NO	2	0.	0.	0.		P/V = 16.701 C = 129.028
40 112	SHELL EXTR		1689.80 O.	913.65 0.	1430.35 1430.35	5432148.4 40935.1	CKING NO 2
42	LO NO	1	110.28	676.00	1367.00		P/V =.115E 19 C = 0.000
43	LO NO	2	16.83	674.B0	1371.38		P/V = 4.268 C = 1020.512
100	LO NO	3	0.	0.	0.		P/V = 0.648 C = 1847.487

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TL	PRESS	TEMP	ENTH	FLOW
41 SHELL 79 EXTR				EXP TO STG 4 4926550.2 488974.9
	,			PACKING NO 1
46 LO NO 1	109.14	595.80	1326.88	SQRT P/V = 20.980 4430.5 C = 382.760
47 LO NO 2	16.76	575.70	1323.40	SQRT P/V = 4.390 2996.2 C = 820.036
100 LD ND 3	0.	0.	0.	SQRT $P/V = 0.676$ 603.7 $C = 1847.487$
49 EXH 80 EXTR 50 TO RHT	507.00	607.30	1303.04	EXFAND TO EXHAUST 4952182.0 471082.7 4481099.3
BEFORE LO 37 ENTRY	0.08	٥.	1523.62	REHEATER 1
84 AFTER LO	467.60	1004.30	1523.58	4483722.2 PCTDP = 7.771
51 ENTRY 125 ENTRY		1003.47 804.90		EXPAND TO BOWL 4490995.1 7272.9
52 SHELL 53 EXTR				
				PACKING NO 3
57 LO NO 1	16.75	633.50	1351.31	SQRT P/V = 4.213 1769.3 C = 1151.765
58 LO NO 2	16.75	645.50	1357.13	SQRT P/V = 0.657 1875.1 C = 4690.857
100 LO NO 3	ο.	0.	0.	SQRT P/V = 0.654 603.7 C = 1847.487
100 LO NO 4	0.	0.	0.	SQRT P/V = 0. 603.7 C = 1847.487

TL	PRESS	TEMP	ENTH	FLOW		
				ΕX	KPAND TO EXHAL	JST
56 EXH 55 EXTR	106.10 108.70	621.50 624.80	1339.91 1341.40			
59 ENTRY	106.10	621.50	1339.91	3841718.3	EXPAND TO BOV 3	VL.
61 SHELL 60 EXTR	58.58 57.89	o. 530.00	1281.71 1298.09			15
63 SHELL 62 EXTR	35.72 35.26		1237.13 1249.45	3477102.2 244555.9		16
65 SHELL 64 EXTR	10.46 10.32	0. 242.40	1144.75 1166.52	3353727.2 123375.0		18
107 SHELL 106 EXTR	4.51 4.46	o. o.	1092.19 1090.98	3256836.3 96890.9	3	19
TL	PRESS	TEMP	ENTH	FLOW		
108 TB EXH 76 ENTRY 122 DRAIN	1.73 0. 0.	120.69 0. 0.	1047.4478 O. O.	3256836.3 870800.2 4133871.4		1 4.9 1 1
MEASURED LOA SHAFT 1 KW			PF = 1.000 FL =4353.0		= 62.00 = 6630.0	

# PERFORMANCE

# TRUNKLINE OUTPUT

TI	P	. Т	. н	Q	SV	SP	PV	TR
1	2449 2	535 1	533.3	5483311.	0-0209	0.	o.	
	743.1	772 B	1376.0	488975	0.7113	537.521	-1.579	235.3
	743.1		457.4	488975.	0.0198	0.	5.900	0.
	2669.2			5483311.		ŏ.	0.	
	495.9	606-2	1303.3	471083.	1-1784	466.161	-1.739	140.0
	495.9	393.7	348 A	960058.	0.0185	0-	7.800	0.
	2669.2			5483311.		ŏ.	0.	
8	204 4	802.9	1426.8	206598	3.4195	383.432	-2.268	419.3
	204.4	343.1	314.6	1166656.	0.0179	0.	6- B00	0-
	2754.4	ZZA.Z	311.8	5483311.	0.0176	0-	6.800 0.	o.
	0.	0.	0.11.0	5430704	0.01/0	Õ-	o.	0.
12		A21 3	1779 8	249542	5 9950	771 92A	0. 514.900	289.4
13		790 3	250 0	4014291	0.0173	0.	01-11-700	207.4
14		207.5 200 र	250.0	4016271	0.0173	1 014	o. o.	160 1
15		518 A	1292 3	120040	10 1238	288 208	-0.092	228.8
16				120060.				
	160.1	256 2	201.1	4016292.	0.01/1	0.	4.100 0.	o.
18		######################################	17/57	TOIGETA	15 11L1	757 770	-0.462	150 0
19						0.	-0.462 0 500	137.0
	160.1	177.0	150 7	4016292.	0.0100	٥.	8.500 0.	0.
20	7.9	171.U	1148 1	107775	71 ATOT	102 040	1.569	. 11 7
20	7.7 9:9			487991.			7.000	^ +
22	7×7	100.0	101.0	40/771 <sub>1</sub>	0.0104	0.		0.
20	100.1	100.0	124.0	4010272.	O. 0170	0.	0.	
	4.4	200./	200.0	0.001	0.01/0	154 074	0.576	_154 0
				4016292.			0.376	0.
	0.			4133872.			0.	0.
28		0.	0.	19570.	0.	0.	0.	0.
	0.	0.	0.	45403.	0.		o.	0.
	0.	0.	٥.	64973.	0.	0.	o.	0.
				0.			o.	0.
				4133872.			0.	0.
				-5449.				0.
				5483311.			o.	Õ.
						1465.639		
		896.2	1/145 4	つイ// ひひて	1 4771	0.780	16.701	
38	0.	0.	0.	2155.	0.	0.	0.	129.0
	2388.9	0.		5473083.			85.690	0.
				5432148.				
	762.5	0.		4926550.				842.8
42							4.268	
43				3751.			0.648	
45	0.	0.			0.		0.040	0.
46				4430.				382.8
47	16.8			2996.	36.6972			820.0
48	0.	_					0.070	0.
49	507.0			4960212. 4952182.	0.		20.980	0.
50				4481099.		0.	0.	0.
51	458.2			4491077.			15.686	0.
L	7-10-2	エハハファウ	1020.4	<b>4470770</b> .	1.0027	<b>∵</b>	174 000	Ο.

	P	T	Н	Q	SV	SP	PV	TR
52							7.705	
53							7.565	
54							4.213	
55	108.7	624.8	1341.4	437827.	5.8526	333.911	0.	0.
56		621.5	1339.9	3841718.	5.9789	332.133	0	0.
	16.8						0.657	
	16.8						0.654	
59							4.213	
							2.398	
							2.470	
					9.6006			
					14.7921		1.544	
		٥.			14.1723		1.588	
							0.507	
		o.	1144.8	3353727.	36.9690	195.817	0.532	1047.6
66	16.5	626.5	1347.9	9795.	39.2425	0.	o. o.	0.
67	105.8	334.7	1189.8	0.	4.2198	0.	٥.	0.
68	2.1	480.0	1279.1	0.	268.7139	0.	0.	0.
69	4.5	653.0	1361.5	631.	147.1380	o.	0.	0.
70	4.5				147.1380			0.
					0.			
72	0-	0.	0-	515	0-	0.	0.	
73	Ŏ.	ň.	o.	_42₹5	0.	0.	o.	0.
				6173.			ŏ.	
							o.	
79					0.7057			
80		607.3	1303.0	4/1083.	O.,	0.	٥.	0.
							0.	
							0.	
83					0.		0.	
84	467.6	1004.3	1523.6	4483722.	1.8255	7.771	16.005	800.0
86	0.	0.	0.	117580.	0	0.	0.	0.
88				2752.			0.	
							Ο.	
							o.	
					184.9225			
							0.	
100							o.	
					0.0209			2669.2
							0.238	
						137.483	V. ZOD	0.
					77.9511		0.240	
							3.513	
104	V.		265.3	2138774.	0.	0.	0.	O.
111	105.8	332.0	302.9	6403042.	4.2011	0.	-0.074	o.
112	0.	0.	1430.3	40935.	Q.	O.	0.	O.
113	Ο.	0.	٥.	5415525.	O.	0.	0.115E 19	٥.
114	438.5	126.4	95.5	14848.	0.0162	0.624	O.	438.5
115	438.5	126.4	95.5	14282.	0.0162	0.624	٥.	438.5
116	438.5	126.4	95.5	27472.	0.0162	0.623	0.	438.5
					0.0162	0.660	0.	438.5
					0.0162	0.660	0.	438.5
119	438.5	126.4	95.5	22944.	0.0162	0.660	0.	438.5
					0.		0.	
122	0.	O.	0.	4133871	0-	0.	0.	o.
	4.4	137.1	100 1	587434	0.0163	o.	4.500	0-
175	ALA 5	SUT O	1/17 ^	નાદા/પાં⊸™n ભુત્યુભુત્	1.5616	V. 470	4.500 0.	442 0
127	~~~ ^	UVT.7	~ ~ · · · · · ·	72/3.	1.7010	V. 070	0	~w
الاند بات	104 0		y.	ZV3783.	V.	4 746	o. o.	104.0
191	100.7	041.2	1334.7	101833.	5.4318	1.018	O.	100.7
							0.	
133	Q.	O.	0.	205379.	0.	0.	v.	٥.
201	0.1	0.	1523.6	0.	0.	220.576	0.	0.

Mo test conix

TEST CYCLE HEAT

VALVE POINT VWO-OP

05/15/E

INTERMOUNTAIN PWR PROJECT

820000. KW 2400. PSIG

TC6F-30 1000./ 1000

1410-520P

CALCULATED USING ASME STEAM TABLES

8-ST

T151

COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD HEAT RATE

THROTTLE FLOW

898356. 7772.3 898356. 7772.3

6496919.

6281950.

TURBINE THERMAL PERFORMANCE

	HIGH PRI	ESS TB	REHEAT TB				
			IP TB		ł	LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH	
PRESS	2477.14	590.03	544.47	122.65		3.195	
TEMP	988.20	612.10	995.81	612.80	)	117.29	
ENTH	1450.32	1299.07	1516.74	1334.47	7	1020.74	
ENTR	1.5228		1.7255	1.7411			
EFF	87.	. 790	91.714		93.	902	
ABSCISSA	PHPX/PT=0.2	382	P1STSTG/PT=0.804	15	VAN=	616.5	

THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY RHT TB	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	528.21	336.94		
H ELEP	1020.74		1020.74	
H UEEP	1028.10		1028.10	
EFF ELEP	93.90	93.11	93.90	93.11
EFF UEEP	72.51	90.93	92.51	90.93
VAN	616.52		616.52	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A08-1

VALVE POINT VWO-OP 05/15/87 TEST POINT 08
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC6F-30 IN LSB TURBINE NO 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 898356. 898356. HEAT RATE 7772.3 7772.3 THROTTLE FLOW 6496919. 6281950.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRI	ESS TB	REHEAT TB				
•			IP TB			LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH	
PRESS	2477.14	590.03	544.47	122.65		3.195	
TEMP	988.20	612.10	995.81	612.80	)	117.29	
ENTH	1450.32	1299.07	1516.74	1334.47	7	1020.74	
ENTR	1.5228		1.7255	1.7411	•		
EFF	87.	. 790	91.714		93.	902	
ABSCISSA	PHPX/PT=0.2	382	P1STSTG/PT=0.804	5	VAN=	616.5	

THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

	TOTAL TB ENERGY	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	528.21	336.94		
H ELEP	1020.74		1020.74	
H UEEP	1028.10		1028.10	
EFF ELEP	93.90	93.11	93.90	93.11
EFF UEEP	92.51	90.93	92.51	90.93
VAN	616.52		616.52	

\* LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A08-1

# T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1023.00		1023.00	
H UEEP	1030.39		1030.39	
EFF ELEP	73.48	72.44	93.48	92.44
EFF UEEP	92.07	90.25	92.07	90.25
VAN	618.01		618.01	

# STAGE FLOW FUNCTION

STE		ONE VEL HD	PCT DELTA	P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1992.87	0.	0.	0.	86.6	0.	6438694.	1007.5
4	1124.35	4.554	1.28	1110.00	157.4	850.9	5801024.	845.5
RH 1	544.47	0.	0.	0.	350.2	0.	5249181.	800.5
8	533.58	0.	0.	0.	350.2	0.	5262602.	818.8
11	242.73	0.849	1.12	240.01	711.2	792.4	5019764.	782.2
15	122.65	0.	0.	o.	807.6	0.	4463988.	1128.8
15	67.63	0.311	1.33	66.73	1414.8	1089.7	4315958.	1063.6
16	41.18	0.202	1.42	40.59	2021.4	1104.1	4019545.	1080.1
18	12.09	0.064	1.53	11.91	6018.0	1071.1	3865914.	1044.7
19	5.14	0.028	1.57	5.06	12096.0	1132.1	3724659.	1123.2

- 1	proces :	yraun .	Carrent Carrent	ምሌ	2 7	A .	enter.	gase	R	Tarred .	<b>.</b> .	proof.	general Contract of the Contra
- 4	en l	in.	in.	4.3	5.8.7	4.3		- Dear	gov."	ŧ	v	ŧ.	g-m

						ATER	8
					6502076.0		
	EXTR	1098.85			614860.0		
3	DRAIN	1098.85	489.30	475.24	614860.0	DC =	7.6
					HE	ATER	7
7	FW IN	2830.00	397.50	375.61	6502076.0	CLOSED	
5	EXTR	577.10			585006.7		
		577.10			1199866.7	DC =	9.2
3	ENTRY	1098.85	489.30	475.24	614860.0		
					HE	ATER	6
10	FW IN	3013.10	348.50	324.83			
		238.20			242838.4		
		238.20			1442705.1		
		577.10		382.70			
	-					UMP	
11	<b>Г</b> Ш ТN	٥	0	0	6460944.9		-
					106069.8		
	SEAL RET	o.			64938.7		
		o.		o.	0.		
				266.73			
					6502076.0		
					, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	. W with time that	gione
4	FW IN	171 00	200 00	27.7.70	4725859.4	ATER	5
					291668.6		_1024 9
		122.35			7355973.9		
	ENTRY			280.50	2337734.2		0.0
			-				
4	mil thi	4/7 50				ATER	4
	EXTR				4725859.8		
		65.46 65.46		1287.74 240.02			0.4 5.1
10	DUHLIA	00.40	2/1:00	240.V2	140027.7	<i>u</i> c	J. I
					HE	ATER	3
	FW IN	167.90	197.70	166.13	4725859.8	CLOSED	
	EXTR	39.21	409.70	1241.24	296412.4	TD =	0.1
	DRAIN	39.21	207.00	175.19	444442.1	DC =	9.3
16	ENTRY	65.46	271.00	240.02	148029.7		
					HE	ATER	2
23	FW IN	167.90	160.90	129.25	4725859.8	CLOSED	
21	EXTR	11.40	228.90	1159.77	153631.6	TD =	1.8
22	DRAIN	11.40	168.70	136.68	598073.7	DC =	7.8
19	ENTRY	39.21	207.00	175.19	444442.1		

Т	nota		PRESS	TEMP	ENTH	FLOW	
70	TDV TDV		5.14 1.88	0. 644.60 480.00 MEAS TOTA	1357.36 1279.08	8020.4 8020.4 0.	TM SEAL REG CALCULATED TO HEATER TO CONDENSER
25 123 22	FW II EXTR DRAII ENTR'	N Y	4.91 4.91 11.40	0.	1086.23 98.36 136.68	4725859.8 141255.1 747349.1 598073.7	TD = 0.6 DC = 6.2
87		<age< td=""><td>. 0.</td><td>o. o. o.</td><td>0. 0. 0.</td><td>4831<b>929.</b>6 0. 4831<b>929.</b>6</td><td></td></age<>	. 0.	o. o. o.	0. 0. 0.	4831 <b>929.</b> 6 0. 4831 <b>929.</b> 6	
1	FW :	IN	2830.00	554.30	551.63		W TO BOILER S+L = -5157.
			Т	URBIN	EEXP	NSION	
				0. 988.20		0. 6496919.1	AIN STEAM LINE
							P/V = 89.971
37	LO NO	1	544.67	872.85	1450.31	2863.5	
38	LO .NO	) 2	0.	0.	0.		P/V = 19.687 C = 106.199
			1992.87 O.			6438693.9 53270.9	
							P/V =.115E 19
42	LO NO	) 1	127.70	677.50	1366.82	14646.0	C = 0.000
43	LO NO	2	17.18	668.60	1368.34		P/V = 4.943 C = 1651.600
100	LO NO	3 3	0.	0.	0.		P/V = 0.663 C = 1907.083

A08-4

T	_		PRESS	TEMP	ENTH	FLOW
	SHELL EXTR			0. 781.40	1372.55 1372.55	614860.0
					÷	
46	LO NO	1	126.30	592.10	1323.82	SQRT P/V = 24.537 5338.4 C = 389.192
47	LO NO	2	17.02	571.70	1321.46	SQRT P/V = 5.097 3577.5 C = 826.231
100	LO NO	3	0.	0.	0.	SQRT P/V = 0.688 633.6 C = 1907.083
80	EXH EXTR TO RH		590.03 590.03 590.03	612.10 612.10 612.10		585006.7
	BEFORE ENTRY	LO	0.08	0.	1517.05	REHEATER 1
	AFTER	LO	544.47	996.30	1517.01	5249180.9 PCTDP = 7.722
	ENTRY		533.58 545.13	995.21 802.90	1516.74 1412.61	EXPAND TO BOWL 5262601.9 13420.9
	SHELL EXTR		242.73 240.01	0. 797.50	1412.55 1422.54	EXP TO STG 11 5019763.5 242838.4
						PACKING NO 3
57	LO NO	1	17.00	632.10	1350.61	SQRT P/V = 4.897 2280.0 C = 1165.281
58	LO NO	2	17.00	641.50	1355.17	SQRT $P/V = 0.667$ 2158.7 $C = 5133.372$
100	LO NO	3	0.	0.	0.	SQRT P/V = 0.665 633.6 C = 1907.083
100	LO NO	4	0.	0.	0.	SQRT P/V = 0. 633.6 C = 1907.083

TL	PRESS	TEMP	ENTH	FLOW		
56 EXH 55 EXTR			1334.47 1336.09	4463987.		UST
59 ENTRY	122.65	612.80	1334.47		EXPAND TO BO 5	NL.
61 SHELL 60 EXTR			1275.97 1292.66	4315957.		15
63 SHELL 62 EXTR			1231.68 1244.52	4019545.		16
65 SHELL 64 EXTR			1140.38 1155.69	3865913.		18
107 SHELL 106 EXTR	5.14 5.06	o. o.	1086.76 1086.23	3724658.		19
TL	PRESS	TEMP	ENTH	FLOW		
108 TB EXH 76 ENTRY 122 DRAIN	1.57 0. 0.	117.29 0. 0.	1028.1024 0. 0.			1 5.2 1
MEASURED LOA SHAFT 1 KV			PF = 1.00 FL =4353.0		= 63.00 = 7795.5	

# PERFORMANCE

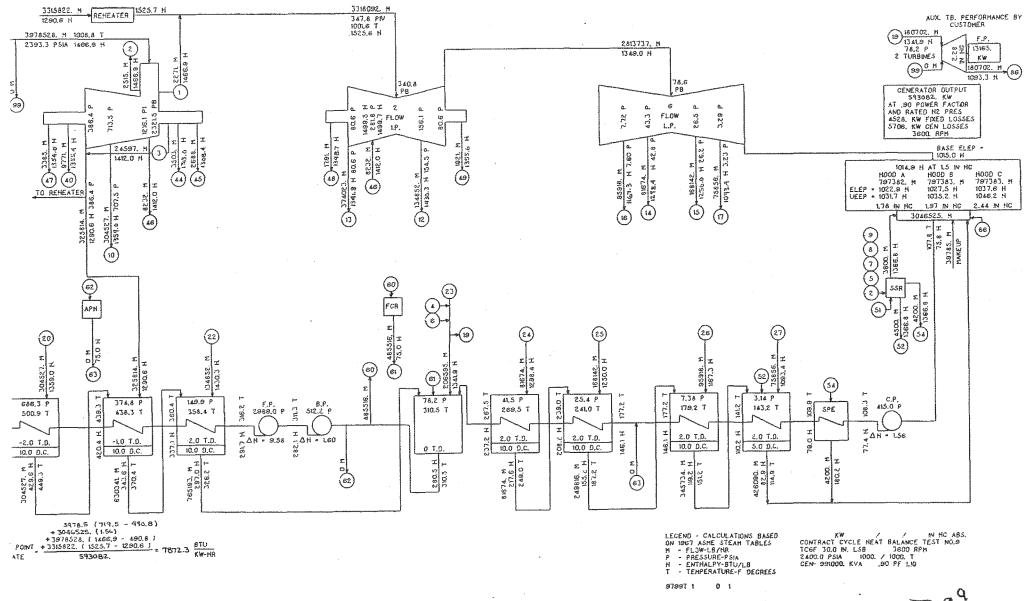
# TRUNKLINE OUTPUT

	F	Т	Н	Q	sv	SP	PV	TR
1 :	2830.0	554.3	551.6	6502076.	0.0213	0.	0.	-5156.9
2 :	1098.9	779.4	1371.9	614860.	0.6049	556.147	1.847	223.3
3	1098.9	489.3	475.2	614860.	0.0201	o.	7.600	0.
4 7	2830.0	481.7	466.B	6502076.	0.	0.	٥.	0.
5	577.1	610.9	1299.4	585007.	1.0029	482.036	o. o.336	128.9
6	577.1	406.7	382.7	1199867.	0.0187	0.	9.200	o.
7 :	2830.0	397.5	375.6	6502076.	0.	0.	0.	0.
8	238.2	796.3	1422.0	242838.	3.0800	396.736	-0.764	399.6
							8.000	
							0.	
							0.	
12	122.4	613.7	1334.9	291669.	5.1327	342.726	-1024.800	271.0
13	131.8	298.0	267.8	4725859.	0.0174	0.	0.	0.
14	167.9	298.0	267.8	4725860.	0.0174	1.014	0.	167.9
15							0.447	
16	65.5	271.0	240.0	148030.	0.0172	· O.	5.100	ο.
17	167.9	265.9	235.0	4725860.	0.	0.	0.	Ο.
18	39.2	409.7	1241.2	296412.	13.0355	266.047	0.147	143.7
							9.300	
							0.	
21	11.4	228.9	1159.8	153632.	35.5947	199.469	1.769	29.4
							7.800	
23							0.	
24 1	1500.0	294.5	266.7	0.	0.0173	0.	0.	o.
25	4.9	0.	1086.2	141255.	0.	161.469	o. o.569	-161.5
26	228.4	124.2	92.7	4725860.	0.0162	0.	0.	0.
							0.	
	0.						0.	
	0.				0.			0.
30							0.	
							0.	
				4831930.		0.		o.
							0.	
							0.	
							89.971	
		872.9			1.4053			
38	0.	0.	0.	2091.	0.	0.	O.	106.2
39 2	2477.1	0.			0.3060		89.971	0.
40 1	1992.9			6438694.	0.3659			0.
	1124.3				0.5917			845.5
42	127.7		1366.8		5.2260			
	17.2	<b>668.6</b>			39.0396		0.663	
		0.		39850.	0.	0.	0.	0.
46		592.1			4.8621			
	17.0	571.7			35.9940		0.688	826.2
48	0.	0.		5840874.	0.	o.	0.	0.
					0.9800			0.
	590.0			5246317.			0.	0.
	J70 = U	سلست ستند ساد اسسا	# at 7 7 m . k	コエサロンエノ。	V.	V =	V.	O.

TL	P	T			SV		PV	
52	242.7	٥.	1412.5	5019764.	2.9807	398.783	9.024	782.2
53	240.0	797.5		242838.			8.857	
54	122.6	612.8			5.1153			
								O.
55	125.8	616.4			5.0048			0.
56	122.6	.612.8		4463988.	5.1153	342.911		0.
57	17.0	632.1	1350.6	2280.	38.1675	0.	0.667	1165.3
58	17.0	641.5	1355.2	2159.	38.4989	0.	0.665	5133.4
59		612.8		4443988.	5.1154	0.	4.897	0.
60	66.7		1202 7	148030	0.02A B	299.726	2.781	0.
61					8.2211	700 407	2.868	1063.6
		0.				0/0.00/	4 700	
. 62		416.8			12.6951		1.788	
63	41.2	0.			12.1492			
64	11.9		1155.7		33.6258		0.595	
45	12.1	0.	1140.4	3865914.	31.9879	202.714	0.615	1044.7
66	16.6		1347.5		38.8583			٥.
67				n.	4 1244	0	o.	o.
68	1.9	480.0	1970 1	0.	207 4007	^.	o. o.	o.
			12/7.1		277.8007	0.	۰.	
69		644.6	1357.4	1863.	127.8890	o.	0.	0.
70	5.1	644.6	1357.4	8020.	127.8890		0.	0.
71	٥.	O.	1450.3	0.	0.	0.	0.	0.
72	0.	0.	O.	-1025.	0.			0.
73		o.	o.	-4445	0.	0	0.	o.
75			^.	5015			o.	ŏ.
			٥.	5815.	0.	٥.		
76	Ö.			1102826.		0.	0.	0.
	1110.0	781.4			0.5995		43.031	
80	590.0	612.1	1299.1	585007.	0.	0.	0.	Ο.
81	12.4	625.7	1347.8	0.	52.0502	0.	O.	0.
82	.0.	0.			0.		0.	0.
83	122.4		1190.7	313	0.	0.		0.
84	544.5	776.3	1517 0	57/0101	1.5528	7 777		800.5
	0.		101/10	40/070	1.3320	/ s / disselin	است ا منا ا	000.0
86		0.	٥.	106070.	0.	O.	0.	0.
88		0.	0.	8020.	0.		0.	0.
90		342.7	314.1	0.	0.0179	0.		0.
91	141.7	234.1	202.7	895029.	0.0169	0.647	0.	141.7
95	1.6	117.3	1020.7	3724659.	198.7881	1028.102	3.195	616.5
99	0.	0.	0.	6971.	0.	0.	0.	Ο.
100	o.	O.	0.	634.	o.	0.	0.	1907.1
					0.0213			2830.0
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	400/ 0					
106	5.1	0.	1000.2		69.4398			0.
107	5.1	0.			68.3995			
108	1.6	117.3			218.2728			-4445.2
109		0.	280.5	2337734.	0.		٥.	٥.
111	122.4	342.7	314.1	7355974.	0.0179	0.	0.026	0.
112	0.	0.	1426.6	53271.	0.	0.	0.	0.
113	0.	0.	0.	6415884.	0.	0.	0.115E 19	0.
114	400.4		92 1	14671.	0.0162		0.	400.4
115	400.4	123.1			0.0162		ő.	400.4
				13570.		0.024	٥.	
116	400.4	123.1	72.1	27977.	0.0162			400.4
117	400.4	123.1		11145.	0.0162			400.4
118	400.4	123.1	92.1	20090.	0.0162	0.660		400.4
119	400.4	123.1		18617.	0.0162	0.660	0.	400.4
120	O.	0.	0.	4954.	0.	0.	o.	0.
122	o.	O.	o T	4831930.	o.		0.	o.
123	4.9			747349.	0.0162		6.200	
125	545.1	802.9		13421.	1.3196			537.8
130	0.	0			0.	٥.		0.
131	123.2	613.3	1334.7	134133.	5.0959			123.2
132	123.1	613.1	1334.6	144253.	5.0987	1.020	0.	123.1
133	0.		0.		0.	0.	0.	0.
201	0.1	o.	1517.0		0.	217.978		0.
								- <del>-</del>

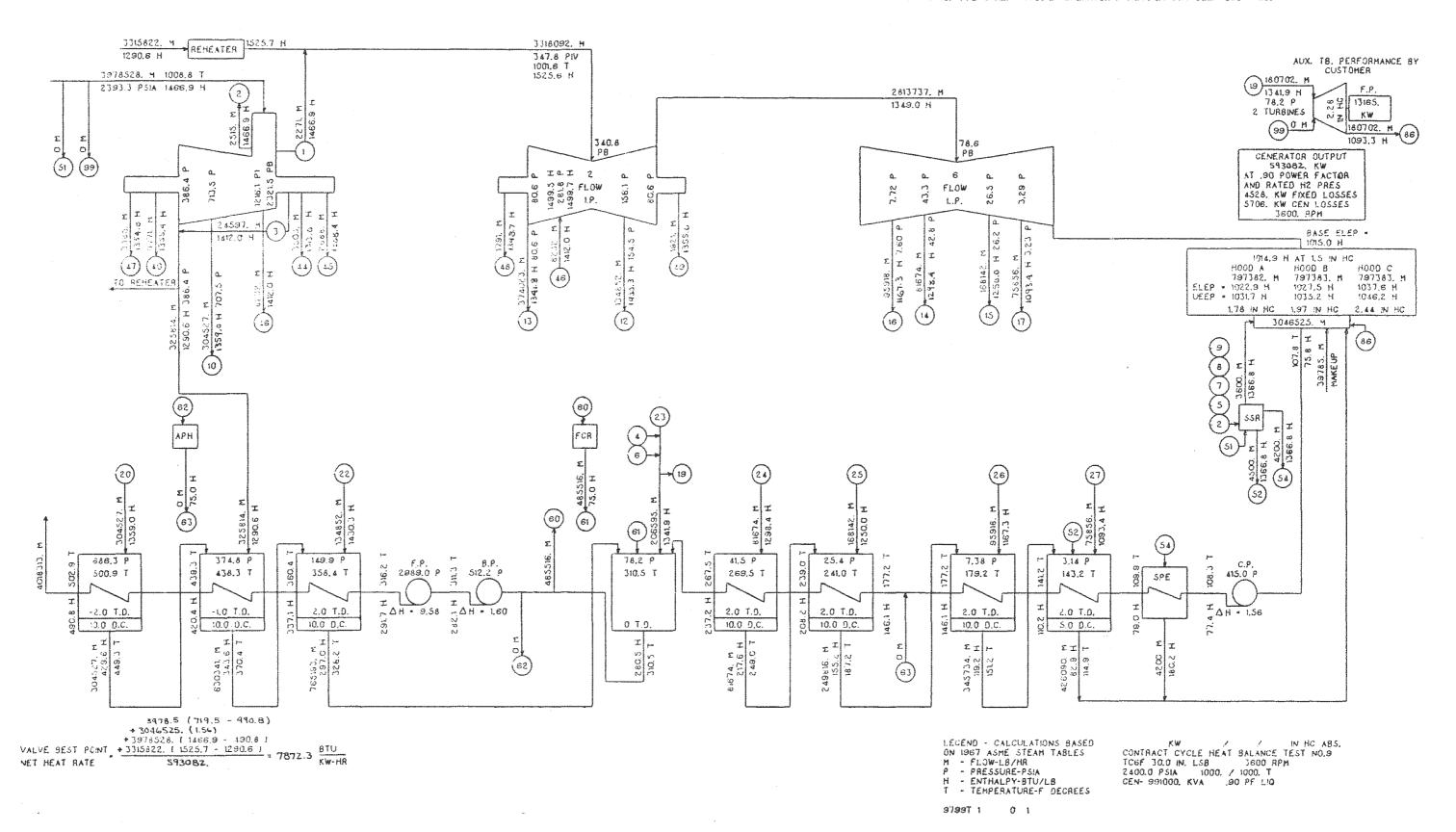
A08-8

THE VALUE OF CEMERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBUNE-CEMERATOR AUXILIARIES HAS BEEN DEDUCTED.



P14\_005001

THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



CENERAL ELECTRIC COMPANY, SCHENECTABY N.Y.

5/14/87 FIG. 96

VALVE POINT 2ND VL 05/16/87 TEST POINT 09
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC6F-30 IN LSB TURBINE NO 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 599736. 599283. HEAT RATE 7756.9 7762.8 THROTTLE FLOW 3978528. 4035857.

## TURBINE THERMAL PERFORMANCE

	HIGH PR	ESS TB	RE			
			IP TB		LP TB	
÷	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2393.30	378.40	348.70	79.47		2.063
TEMP	1008.80	565.50	1000.99	622.10	)	102.18
ENTH	1466.95	1288.98	1525.28	1341.89	₹	1028.46
ENTR	1.5376		1.7795	1.7951	L	
EFF	81.	. 581	91.669		93.	692
ABSCISSA	PHPX/PT=0.15	581	P1STSTG/PT=0.506	5	VAN=	613.5

#### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
AE	530.27	338.09		
H ELEP	1028.46		1028.46	
H UEEP	1035.99		1035.99	
EFF ELEP	93.69	92.71	93.69	92.71
EFF UEEP	92.27	90.48	92.27	90.48
VAN	613.48		613.48	

\* LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A09-1

	TOTAL TB ENERG	Y BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
H ELEP	1030.38		1030.38	
H UEEP	1037.94		1037.94	
EFF ELEP	93.33	92.14	<b>9</b> 3.33	92.14
EFF UEEP	91.90	89.90	91.90	89.90
VAN	614.71		614-71	

# STAGE FLOW FUNCTION

STO		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1212.30	0.	0.	0.	86.6	0.	3940932.	999.9
4	706.41	1,877	0.84	700.50	157.4	831.6	3610828.	828.1
RH 1	348.70	0.	0.	0.	350.2	0.	3319610.	795.6
8	341.73	0.	0.	0.	350.2	0.	3327842.	813.7
11	155.15	0.484	1.00	153.60	711.2	790.4	3182051.	781.6
15	79.47	0.	0.	0.	807.6	0.	2864751.	1126.7
15	43.95	0.152	1.00	43.51	1414.8	1087.8	2781982.	1066.6
16	26.87	0.109	1.18	26.55	2021.4	1105.1	2607188.	1086.5
18	7.83	0.039	1.45	7.71	6018.0	1096.4	2512066.	1054.9
19	we was	0.019	1.68	3.26	12096.0	1132.4	2417013.	1122.8

FE	E	D	W	Α	T	E	R	C	Y	C	L	E
----	---	---	---	---	---	---	---	---	---	---	---	---

	•						
					HE	ATER	8
4	FW IN	2569.50	439.90	420.64	3982651.3	CLOSED	
2	EXTR	695.60	718.80	1357.14	317220.6	TD =	-4.1
3	DRAIN	695.60	444.20	423.90	317220.6	DC =	4.3
		-					
						ATER	7
7	FW IN	2569.50	363.90	340.05	3982651.3	CLOSED	
5	EXTR	370.50	564.60	1289.18	311995.5	TD =	-2.7
6	DRAIN	370.50	369.70	342.87	629216.1	DC =	5.8
3	ENTRY	695.60	444.20	423.90	317220.6		
							_
						ATER	6
10	FW IN	2698.50	315.30	290.23	3982651.3		_
8	EXTR	153.20	801.90	1428.42	145791.1		-3.8
9	DRAIN	153.20	320.50	291.03	775007.2	DC =	5.2
6	ENTRY	370.50	369.70	342.87	629216.1		
					poo.	: :Lar	
		_	_		•	UMP	
	FW IN	0.	o.	0.	3953704.5		
	SEAL INJ	0.	o.	0.	87343.2		
	SEAL RET	O.	0.	o.	58396.4		
32	LEAKAGE	O.	0.	O	0.		
	EXTR	1500.00	223.68	195.18	0.		
35	FW OUT	2698.50	315.30	290.23	3982651.3		
			02000	إرسفي فمسوف ووريشي والتصوي	AND I SOUTH SECUL SOUTH NOW AND AND		
			Service Service Services	خوانده و پخت ع موسد پهند°			5
					HE	ATER	5
13	FW IN	87.85	271.80	240.88	HE 2999607.5	ATER OPEN	
13 12	FW IN	87.85 78.92	271.80 619.20	240.88 1340.49	HE 2999607.5 179814.5	ATER OPEN STO =	522.8
13 12 111	FW IN EXTR DRAIN	87.85 78.92 78.92	271.80 619.20 311.50	240.88 1340.49 281.59	HE 2999607.5 179814.5 5117596.3	ATER OPEN	
13 12 111	FW IN	87.85 78.92	271.80 619.20	240.88 1340.49	HE 2999607.5 179814.5	ATER OPEN STO =	522.8
13 12 111	FW IN EXTR DRAIN	87.85 78.92 78.92	271.80 619.20 311.50	240.88 1340.49 281.59	HE 2999607.5 179814.5 5117596.3 1938899.0	ATER OPEN STO =	522.8
13 12 111 109	FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0.	271.80 619.20 311.50 0.	240.88 1340.49 281.59 246.49	HE 2999607.5 179814.5 5117596.3 1938899.0	ATER OPEN STO = SC =	522.8 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0.	271.80 619.20 311.50 0.	240.88 1340.49 281.59	HE 2999607.5 179814.5 5117596.3 1938899.0	ATER OPEN STO = SC = ATER CLOSED	522.8 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0.	271.80 619.20 311.50 0.	240.88 1340.49 281.59 246.49	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7	ATER OPEN STO = SC = ATER CLOSED	522.8 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY FW IN EXTR	87.85 78.92 78.92 0.	271.80 619.20 311.50 0. 242.50 516.00	240.88 1340.49 281.59 246.49 211.20 1292.55	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7 82769.1	ATER OPEN STO = SC =  ATER CLOSED TD =	522.8 -0.4 4 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY FW IN EXTR	87.85 78.92 78.92 0.	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1	ATER OPEN STO = SC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY FW IN EXTR	87.85 78.92 78.92 0.	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED	522.8 -0.4 4 -0.4 3.0
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED	522.8 -0.4 4 -0.4 3.0
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD =	522.8 -0.4 4 -0.4 3.0
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD =	522.8 -0.4 4 -0.4 3.0 3
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN  EXTR	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1 HE	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN EXTR DRAIN ENTRY	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1 HE	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16 23 21	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN EXTR	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1  HE 2999607.7 95122.8	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16 23 21 22	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN EXTR DRAIN ENTRY	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1  HE 2999607.7 95122.8	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1

The state of the s	L		PRESS	TEMP	ENTH	FLOW	
70	TDV TDV		3.23 1.26	462.70	1270.82 1279.14	1436.1 1436.1 0.	TO HEATER
25 123	EXTR DRAIN	4	3.16 3.16	0. 113.50 462.70	1093.76 81.48	2999607.7	ATER 1 CLOSED TD = 0.5 DC = 3.2
87	LEAK	AGE	0.	0.	0.	Pl 3086951.0 0. 3086951.0	
	•					F	V TO BOILER
1	FW I	N	2569.50	506.50	494.97	3982651.3	S+L = -4124.
			т	URBIN	E E X P A	NGION	
71 36	EXIT THROT	TLE	0. 2393.30	0. 1008.80	1466.95 1466.95		AIN STEAM LINE
						VF	ALVE STEM LKG
37	LO NO	1	348.90	890.69	1466.95	SQRT 2262.0	P/V = 85.758 C = 55.815
38	LO NO	2	0.	0.	0.		P/V = 12.437 C = 202.994
40 112	SHELL EXTR		1212.30	846.80 0.	1408.33 1408.33	39 <b>4</b> 0931.7 32809.6	(P TO STG 1 CKING NO 2
							P/V =.115E 19
42	LO NO	1	82.75	648.00	1354.59		C = 0.000
43	LO NO	2	15.38	638.80	1353.96		P/V = 3.238 C = 1072.812
100						SQRT	P/V = 0.602

A09-4

T	L		PRESS	TEMP	ENTH	FLOW
	SHELL EXTR					EXP TO STG 4 3610828.5 317220.6
					-	PACKING NO 1
46	LO NO	4	81.86	562.40	1312.19	SQRT P/V = 15.879 3333.5 C = 381.776
47	LO NO	2	15.33	542.60	1307.63	SQRT P/V = 3.341 2178.3 C = 816.661
100	LO NO	3	0.	٥.	٥.	SQRT P/V = 0.628 550.4 C = 1839.689
80			378.40	565.50	1288.98	EXPAND TO EXHAUST 3629343.8 311995.5 3317348.3
37	ENTRY			٥.		
84	AFTER L	_0	348,70	1001.60	1525.60	3319610.3 PCTDP = 7.849
	ENTRY ENTRY		341.73 349.70	1000.61 754.00	1525.28 1395.11	EXPAND TO BOWL 3327842.3 8232.0
	SHELL EXTR					EXP TO STG 11 3182051.3 145791.1 PACKING NO 3
57	LO NO	1	15.33	630.20	1349.79	SQRT P/V = 3.148
58	LO NO	2	15.33	644.40	1356.68	SQRT P/V = $0.602$ 1392.4 C = $4139.534$
100	LO NO	3	O	٥.	0.	SQRT P/V = 0.598 550.4 C = 1839.689
100	LO NO	4	0.	O	0.	SQRT P/V = 0. 550.4 C = 1839.689

A09-5

TI	-	PRESS	TEMP	ENTH	FLOW	
	EXH . EXTR	79.47 81.53	622.10 624.50	1341.89 1342.95	2864750.	XPAND TO EXHAUST 7 2
59	ENTRY	79.47	622.10	1341.89	2864750.	EXPAND TO BOWL 7
	SHELL EXTR	43.95 43.51	0. 531.20	1284.38 1299.87	2781981 82769.	EXP TO STG 15 6 1
	SHELL EXTR	26.87 26.55	0. 426.60	1239.88 1251.06	2607188. 174793.	EXP TO STG 16 3 3
65 64	SHELL EXTR	7.83 7.71	o. 244.20	1146.72 1168.17	2512065.	EXP TO STG 18 5 8
	SHELL EXTR	3.32 3.26	o. o.	1093.63 1093.76		
76 22	TB EXH ENTRY ENTRY DRAIN	1.01 0. 7.34	0.	0. 132.97	312405.	2
						GENERATOR 1 SHAFT 1
	ASURED LOAI AFT 1 KW			PF = 0.990 FL =4353.0		= 63.00 = 5338.8

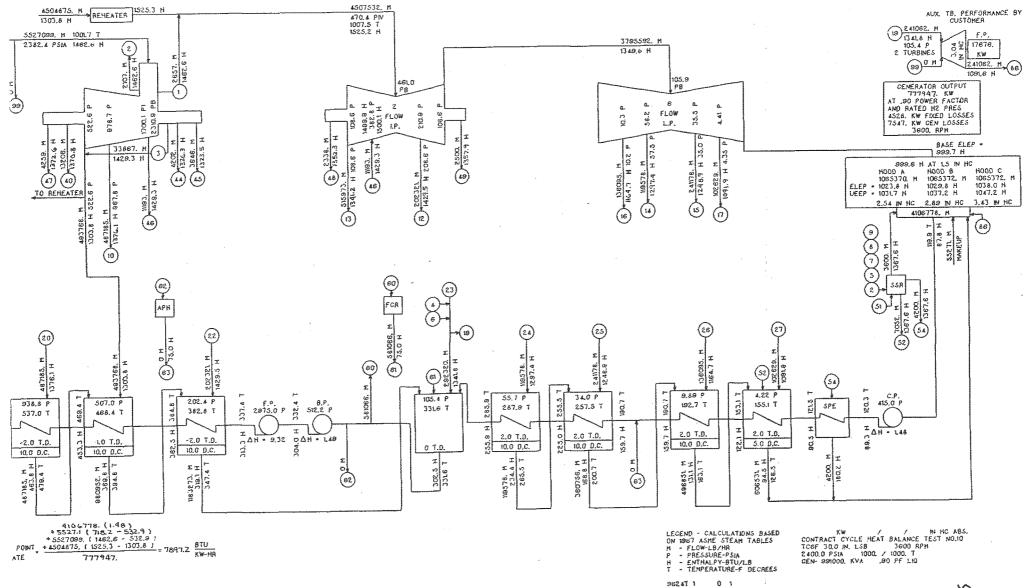
# TEST CYCLE HEAT BALANCE

# PERFORMANCE

# TRUNKLINE OUTPUT

TL	P	Т	Н	Q	sv	SP	PV	TR
	2569.5		495.0	3982651.	0.0202	0.	0.	-4123.5
	695.6		1357.1		0.9335	502.379	-4.121	216.4
3	695.6			317221.		0.	4.300	
	2569.5		420.6	3982651.	0.	0.	0.	0.
5	370.5	564.6	1289.2	311995.	1.5336	437.166	-2.734	127.4
6	370.5	369.7	342.9	629216.	0.0182	0.	5.800	0.
7	2569.5	363.9	340.1	3982651.	0.	0.	0.	0.
8	153.2	801.9	1428.4	145791.	4.8453	360.098	-3.802	441.8
9	153.2	320.5	291.0	775007.	0.0177	0.	5.200	0.
10	2698.5	315.3	290.2	3982651.	0.0174	0.	O	0.
11	0.	٥.	0.	3953704.	0.	0. 311.102	0.	0.
12	78.9	619.2	1340.5	179814.	8.0518	311.102	522.800	308.1
13	87.9	271.8	240.9	2999608.	0.0172	0.	O.	0.
14	130.6	271.8	241.0	2999608.	0.0172	1.014	0.	130.6
15	42.8	516.0	1292.5	82769.	13.4585	271.362	-0.43B	244.6
16		245.5	214.1	82769.	0.0170	0.	3.000	0.
17	130.6	242.5	211.2	2999608.	0.	0.	0.	0.
18	25.6	416.3	1246.2	174793.	20.2241	241.366		174.9
19	25.6	184.6	152.7	257562.	0.0165	0.	7.100	
20	130.6	177.5	145.8	2999608.	0.	0.	0.	0.
21		237.2	1165.0	95123.	56.2127	178.945	1.445	
22						0.	21.900	0.
23				2999608.			0.	
	1500.0	223.7	195.2	٥.	0.0167	0.	0.	
						143.570	0.470	-143.6
26	169.2			2999608.			0.	٥.
27	0.			3086951.			0.	0.
28	0.	0.		17687.		O.	0.	0.
29	0.	0.		40709.	0.		0.	0.
30				58396.	0.	0.	0.	0.
31	2697.9			o.		0.	0.	0.
	0.			3086951.			0.	0.
	٥.		0.			0.		0.
				3982651.			0.	0.
						1466.949		
37		890.7				0.780		
38	0.	0.	0.	2525.	0.	O.	0.	203.0
	2393.3			3973741.			85.758	
				3940932.				
41		٥.		3610828.				828.1
				9408.			3.238	
	15.4	638.B					0.602	
45	0.	· · · ·			o	0.	0.	0.
46				3333.				
47	15.3	542.6		2178.			0.628	
48	0.	0.			0.		0.	٥.
49				3629344.			15.879	0.
50				3317348.			0.	0.
51	341.7	1000.6	1525.3	3327842.	2.5069	0.	11.678	0.

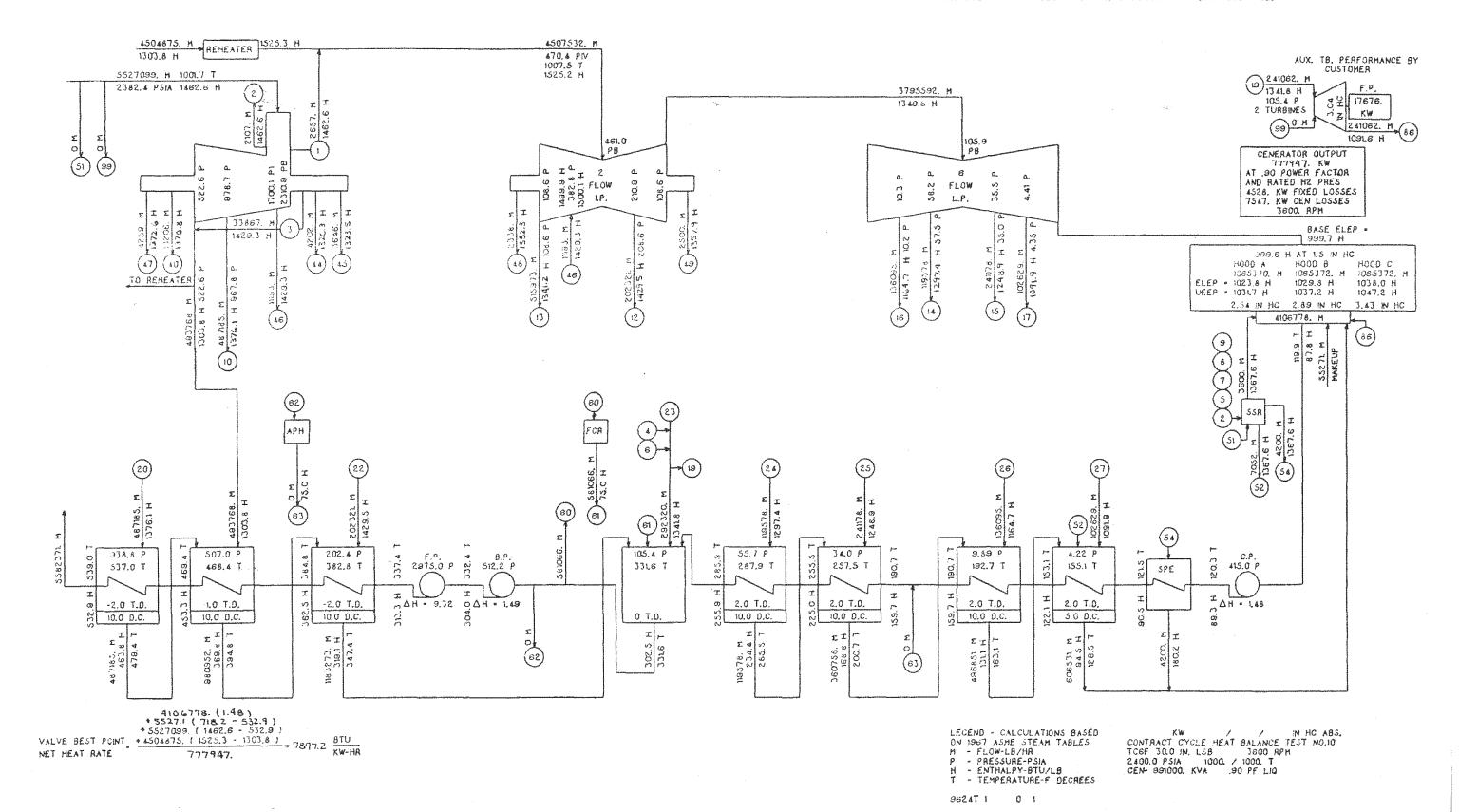
edges §				, and	<b>731.1</b>	On	PM I	State gare,
TL	P	T	Н	G.	SV	SP	PV	TR
52	155.1	0.			4.7345			
53	153.6	804.2	1429.6					0.
54	79.5	622.1		3178297.			3.148	
55	81.5	624.5	1343.0					0.
56	79.5	622.1			8.0179			Ο.
57	15.3	630.2	1349.8		42.2607		0.602	1192.5
58	15.3	644.4	1356.7	1392.	42.8154	0.	0.598	4139.5
59	79.5	622.1	1341.9	2864751.	8.0179	0.	3.148	0.
60	43.5	531.2	1299.9	82769.	13.4503	272.370	1.799	0.
61	43.9	O.	1284.4	2781982.	12.9301	273.346	1.844	1066.6
62	26.5	426.6	1251.1	174793.	19.7239	243.420		
63	26.9	0.			19.0663			
64	7.7	244.2	1168.2		54.0014			
65	7.8	o.			49.9895			
66	15.1	613.2	1341.6		42.1195		0.	0.
67	78.9	314.0	1184.4		5.5677	o.	ŏ.	0.
68	1.3	480.0	1279.1	Ŏ.	443.4005	o.	ŏ.	0.
69	3.2	462.7	1270.8	0.	169.7525	0.	0.	0.
70	3.2	462.7	1270.8	1.672	169.7525	0.		
71	· 0.		1466.9				٥.	0.
		0.		0.	0.	0.	0.	0.
72	0.	0.	0.		0.	o.	٥.	0.
73	0.	0.	0.			Ο.	0.	0.
75	0.	0.	٥.	5542.		٥.	0.	0.
76	0.	o.	o.			٥.	0.	0.
79	700.5	720.6	1357.9					0.
80	378.4		1289.0	311995.		0.	0.	0.
81	15.1	613.2	1341.6	0.	42.0916	0.	0.	0.
82	0.	0.	0.	3317348.	0.	o.	0.	٥.
83	78.9	311.1	1182.8	202.	0.	O.	0.	0.
84	348.7	1001.6	1525.6	3319610.	2.4566	7.849	11.914	795.6
86	0.	0.	0.	87343.		0.	0.	0.
88	0.	0.	0.	1436.	0.	0.	0.	0.
90	108.9	311.5			0.0176		0.	0.
71	114.1	248.1	21A-B	1163892.	0.0170	0.647		114.1
75	1.0				304.8236			613.5
99	o.	0.	0.		0.		0.	0.
100	ŏ.	Ŏ.	0.	550.	ŏ.	o.	o.	1839.7
	2569.5			3985723.		1.028		2569.5
106	3.3	0.			106.4798		0.175	
107	3.3	o.			104.7646		0.178	
108	1.0	102.2			329.4876			-4848.2
109	0.	0.		1938899.			0.	0.
111	78.9			5117596.		o.	-0.398	0.
112	0.	0.	1408.3			0.	0.	0.
113								
	0.	0.	0.		0.		0.115E 19	0.
114	477.5	108.5	77.7					477.5
115	477.5	108.5	77.7					477.5
116	477.5	108.5	77.7				0.	477.5
117	477.5	108.5	77.7	14945.		0.660		477.5
118	477.5	108.5	77.7	O.		0.	0.	0.
119	477.5	108.5		17244.	0.0161	0.660		477.5
120	0.	0.		4787.	0.	0.	O.	0.
122	0.	0.	Ο.	3086951.	0.	0.	0.	0.
123	3.2	113.5		96489.	0.0162	0.	<u>3.200</u>	
125	349.7	754.0	1395.1	8232.	2.0007	0.628	٥.	345.5
130	0.	٥.	0.	146474.	0.	0.	O.	0.
131	79.9	619.2		70599.	7.9520	1.018	0.	79.9
132	80.1	618.9					0	80.1
133	0.	0.	0.			0.	0.	0.
201	0.1	0.	1525.6	0.	0.	236.662	0.	0.



ERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

IP14\_005011

TP-9 10 FIG. 9H



CENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

5.116/87 FIG. 9H

#### TEST CYCLE HEAT BALANCE

VALVE POINT 3RD VL 05/16/87 TEST POINT 10 INTERMOUNTAIN PWR PROJECT UNIT #2 E20000. KW TC6F-30 IN LSB TURBINE NO 270T151 2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

#### CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 789272. 788480. HEAT RATE 7784.0 7791.8 THROTTLE FLOW 5527099. 5612929.

### TURBINE THERMAL PERFORMANCE

	HIGH PR	ESS TB	•	REHEAT TB		
			IP T	В	L	P TB
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2382.40	512.70	473.00	107.50		2.956
TEMP	1001.70	606.50	1007.01	624.60	1	114.54
ENTH	1462.61	1302.07	1524.88	1341.37	•	1030.66
ENTR	1.5351		1.7462	1.7618	}	
han be bu	86.	. 188	91.69	18	93.4	-68
ABSCISSA	PHPX/PT=0. 2	152	P1STSTG/PT=0.7	131	VAN=	588.8

### THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

AE	TOTAL TB ENERGY RHT TB 528.77	BALANCE LP TB 336.32	LP TB ENERGY RHT TB	BALANCE LP TB
H ELEP H UEEP EFF ELEP	1030.66 1038.10 93.47	92.39	1030.66 1038.10 93.47	92.39
EFF UEEP VAN	92.06 588.80	90.17	73.47 72.06 588.80	90.17

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A10-1

	TOTAL TB ENERGY	/ BALANCE LP TB	LP TB ENERGY	BALANCE LP TB
H ELEP	1032.68	hape t 1 das*	1032.68	terms t day
H ELEF	1002.00		1002.00	
H UEEP	1040.16		1040.16	
EFF ELEP	93.08	91.78	93.08	91.78
EFF UEEP	91.67	89.56	91.67	89.56
VAN	590.06		590.06	

# STAGE FLOW FUNCTION

STE NC		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1698.80	0.	0.	0.	86.6	0.	5477243.	1007.5
4	973.63	3.438	1.11	962.80	157.4	843.3	4964326.	838.5
RH 1	473.00	0.	0.	0.	350.2	0.	4522392.	798.5
8	463.54	0.	0.	0.	350.2	0.	4533585.	816.7
11	210.70	0.720	1.09	208.40	711.2	791.2	4326377.	782.0
15	107.50	0.	0.	0.	807.6	0.	3884894.	1128.6
15	59.35	0.245	1.20	58.64	1414.8	1089.7	3762662.	1066.9
16	36.17	0.164	1.31	35.70	2021.4	1106.4	3514296.	1086.2
18	10.57	0.052	1.42	10.42	6018.0	1091.1	3386760.	1052.5
19	4.50	0.023	1.46	4.44	12096.0	1133.7	3267123.	1125.3

F-	F	F	D	Ы	Δ	T	=	R	C	Y	£	F

			,				
					HE	ATER	8
4	FW IN	2658.10	468.90	452.50	5487507.4	CLOSED	
2	EXTR	953.50	771.80	1374.82	495782.4	TD =	-1.9
స్	DRAIN	953.50	475.10	458.86	495782.4	DC =	6.2
					HE	ATER	7
7	FW IN	2658.10	387.10	364.43	5487507.4	CLOSED	
5	EXTR	501.00	605.40	1302.37	470775.2	TD =	-1.7
6	DRAIN	501.00	394.70	36 <b>9.6</b> 8	966557.6	DC =	7.6
3	ENTRY	953.50	475.10	458,86	495782.4		
						ATER	6
	FW IN	2742.60	337.40	312.94	5487507.4		
	EXTR	207.00	806.50	1428.55	207207.6		-2.4
	DRAIN	207.00	344.30	315.90	1173765.2	DC =	6.9
6	ENTRY	501.00	394.70	369.68	966557.6		
					_		
		_	_		•	·UMP	
	FW IN	O.	0.	0.	5486207.6		
	SEAL INJ	0.	0.	0.	108611.9		
	SEAL RET	o.	0.	0.	63704.0		
32	LEAKAGE	0.	0.	0.	0.		
	EXTR	1500.00	200.00	171.47	0.		
35	FW OUT	2742.60	337.40	312.94	5531115.4	•	
					н	ATER	5
13	FW IN	116.30	290.10	257.64	4063570.8		Total Control
12		107.10	624.30	1341.25	248885.5		-257.2
111	DRAIN	107.10	333.10	304.04			-0.3
	ENTRY	0.	0.	267.62	2125156.0	<u> </u>	0.0
107	hma 6 74	•	~*	due but / it had along			
					HE	ATER	4
17	FW IN	161.80	258.80	227.79	4063571.6	CLOSED	
	EXTR	57.56	520.40	1293.41	122231.4	TD =	-0.1
16	DRAIN	57.56	263.00	231.85	122231.4		4.2
					HE	ATER	3
20	FW IN	161.80	191.60	159.99	4063571.6	CLOSED	
18	EXTR	34.53	419.30	1246.53	248366.5	TD =	-0.3
19	DRAIN	34.53	200.30	168.44	370597.9	DC =	8.7
16	ENTRY	57.56	263.00	231.85	122231.4		
					HE	ATER	2
		161.80		124.14			
21	EXTR	10.00		1164.21			1.6
	DRAIN	10.00			498133.5	DC =	7.1
19	ENTRY	34.53	200.30	168.44	370597.9		

Т			PRESS	TEMP	ENTH	FLOW	
70	TDV TDV		4.47 1.73	0. 655.80 480.00 MEAS TOTA	1362.82 1279.10	3136.5 3136.5 0.	TM SEAL REG CALCULATED TO HEATER TO CONDENSER
25 123 22	EXTR DRAIN		4.32 4.32 10.00	0. 126.50	1093.23 94.46 130.87	4063571.6 119637.6 620907.5 498133.5	TD = 0.4 DC = 5.7
87		3E	0.	o. o.	0.	Pt 4172183.4 0. 4172183.4	UMP
						F	W TO BOILER
1	FW IN		2658.10	540.70	535.26	5487507.4	S+L = -4016.
	•		Т	URBIN	EEXPA	NSION	
				0. 1001.70		0.	AIN STEAM LINE
						V	ALVE STEM LKG
37	LO NO	1	473.20	890.85	1462.61	SQRT 2643.9	P/V = 85.663 C = 55.622
38	LO NO	2	0.	0.	0.		P/V = 16.934 C = 125.247
	SHELL		1698.80	911.18 0.	1428.41 1428.41	5477243.4	XP TO STG 1
						PAG	CKING NO 2
42	LO NO	1	112.00	682.00	1369.92		P/V =.115E 19 C = 0.000
43	LO NO	2	16.82	675.50	1371.73		P/V = 4.322 C = 1016.109
100	LO NO	3	0.	٥.	0.		P/V = 0.647 C = 1973.597

TL	PRESS	TEMP	ENTH	FLOW
41 SHELL 79 EXTR	973.63 962.80	o. 773.80	1375.56 1375.56	EXP TO STG 4 4964325.7 495782.4
				PACKING NO 1
46 LO NO 1	110.65	593.20	1325.46	SQRT P/V = 21.239 3985.7 C = 362.561
47 LO NO 2	16.74	574.10	1322.64	SQRT P/V = 4.457 3072.0 C = 833.450
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.676 642.7 C = 1973.597
49 EXH 80 EXTR 50 TO RHT	512.70 512.70 512.70	606.50 606.50 606.50	1302.07 1302.07 1302.07	EXPAND TO EXHAUST 4990523.2 470775.2 4519748.0
BEFORE LO 37 ENTRY	0.08	٥.	1525.18	REHEATER 1 0.
84 AFTER LO	473.00	1007.50	1525.15	4522391.9 PCTDP = 7.743
51 ENTRY 125 ENTRY	463.54 473.85		1524.88 1418.07	
52 SHELL 53 EXTR	210.70 208.40	0. 808.20	1420.51 1429.36	EXP TO STG 11 4326377.3 207207.6
				PACKING NO 3
57 LO NO 1	16.74	638.60	1353.78	SQRT P/V = 4.262 1732.9 C = 1153.252
58 LO NO 2	16.73	650.30	1359.46	SQRT P/V = 0.655 1897.0 C = 4857.146
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.651 642.7 C = 1973.597
100 LO NO 4	O <sub>.</sub>	0.	0.	SQRT P/V = 0. 642.7 C = 1973.597

TL	PRESS	TEMP	ENTH	FLOW
56 EXH 55 EXTR			1341.37 1342.75	
59 ENTRY	107.50	624.60	1341.37	EXPAND TO BOWL 3884893.9
61 SHELL 60 EXTR			1284.30 1299.25	
63 SHELL 62 EXTR				EXP TO STG 16 3514296.0 248366.5
65 SHELL 64 EXTR			1146.86 1166.11	
107 SHELL 106 EXTR	4.50 4.44	o. o.	1093.62 1093.23	EXP TO STG 19 3267122.9 119637.6
TL	PRESS	TEMP	ENTH	FLOW
108 TB EXH 76 ENTRY 122 DRAIN	1.45 0. 0.	114.54 0. 0.	1038.0987 0. 0.	901030.3 4172183.4
				GENERATOR 1 SHAFT 1
MEASURED LOA SHAFT 1 KW			PF = 0.99 FL =4353.0	

# TEST CYCLE HEAT BALANCE

# PERFORMANCE

# TRUNKLINE OUTPUT

	P	Т			sv			TR
1	2658.1	540.7	535.3	5487507.	0.0210	0.	0.	-4016.3
1		771.8	1374.8	495782.	0.7020	538.835	-1.865	233.0
3	953.5	475.1	458.9	495782.	0.0198	0.	6.200	0.
4	2658.1			5487507.			0.	
5	501.0	605.4	1302.4	470775.	1.1641	467.215	-1.685	138.2
6	501.0	394.7	369.7	966558.	0.0185	0.	7.600	0.
7	2658.1	387.1	364.4	5487507.	0.	0.	0.	
8	207.0	806.5	1428.5	207208.	3.5841	384.698	-2.402	421.8
9	207.0	344.3	315.9	1173765.	0.0179	0.	6.900	
10	2742.6	337.4	312.9	5487507.	0.0176	0.	0.	O.
11	0.				0.			0.
12	107.1	624.3	1341.2	248885.	5.9385	332.821	-257.200	291.5
13	116.3	290.1	259.6	4063571.	0.0174	0.	0.	0.
14	161.8	290.1	259.7	4063572.	0.0174	1.014	0.	161.8
15	57.6	520.4	1293.4	122231.	10.0231	290.011	-0.089	230.4
16	57.6	263.0	231.9	122231.	0.0171	0.	4.200	٥.
17		258.8	227.8	4063572.	0.	0.	0.	0.
18	34.5	419.3	1246.5	248367.	14.9977	258.490	-0.310	160.8
19	34.5				0.0166		8.700	
20		191.6	160.0	4063572.	0.	0.	٥.	0.
21	10.0	237.3	1164.2	127536.	41.1588	193.200	1.600	44.1
22	10.0	162.9	130.9	498133.	0.0164	0.	7.100	0.
23	161.8	155.8	124.1	4063572.	0.	0.	0.	0.
24	1500.0	200.0	171.5	0.	0.0166	0.	0.	0.
	4.3	0.	1093.2	119638.	0.	156.155	0.355	-156.2
26		120.8	89.3	4063572.	0.0162	٥.	0.	0.
27		Ö.	0.	4172183.	0.		O.	٥.
28	0.	o.	0	19516.	0	o. o.	0.	0.
29	.0.	O.	0.	44188.	0.	0.	0.	٥.
30	0.	0.	0.	63704.	0.	0.	0.	0.
31	2749.1	336.5	312.0	43608.	0.0176	1.001	0.	2749.1
33	0.	٥.	0.	4172183.	0.	٥.	. 0.	0.
	0.		0.		0.	0.	0.	0.
35	2742.6	337.4	312.9	5531115.	0.0176	0.	0.	0.
36	2382.4	1001.7	1462.6	5527099.	0.32470	.133E 37	85.663	
37	473.2	890.9	1462.6	2644.	1.6502	0.780	16.934	
38	o.	0.	0.	2121.	0.	0.	0.	125.2
					0.3247			0.
							62.774	
					0.6882			838.5
							4.322	
	16.8	675.5	1371.7	3749.	40.1225	0.	0.647	1016.1
45	o.				0.		0.	
46					5.5700			362.6
	16.7		1322.6	3072.	36.6838			833.5
48	0.		0.	4998224.	0.	0.	0.	0.
49	512.7	606.5	1302.1	4990523.	1.1366	469.601	21.239	
50	512.7	606.5	1302.1	4519748.	0.	Ο.	0.	0.
51	463.5	1006.5	1524.9	4533585.	1.8455	0.	15.851	0.

TL	F	T	Н	Q	SV	SP	PV	TR
		0.					7.779	
53				207208.			7.646	
		624.6			5.9178			
54								
55		627.7					0.	
56	107.5	624.6	1341.4	3884894.	5.9178	333.095		0.
57	16.7	638.6	1353.8	1733.	38.9943	0.	0.655	1153.3
58.	16.7	450.3	1359.5	1897.	39,4367	0-	0.651	4857.1
59		624.6	13/1 /	7001001	5 0170	0	4.262	0
60		532.5					2.426	
61		0.					2.493	
62				248367.	14.6492	260.454	1.561	0.
63	36.2	O.	1239.6	3514296.	14.1191	261.500	1.601	1086.2
64	10.4	241.6	1166.1	127536.	39.7310	195-160	0.512	٥.
<u>6</u> 5		0.					0.535	
							0.	
			1347.2	7430.	37.4073	v.	0.	O.
67		335.6	1190.0	0.	4.1713	Ο.	Ο.	O.
68	1.7	480.0	1279.1	0.	323.7902	Ο.	0.	٥.
69	4.5	455.8	1362.8	919.	148.6988	0.	0.	0.
		655.8			148.6988			0.
					0.		o.	
7.1	Δ.	~ ·	1702:0	And Sections.	O.	· ·	o.	~
12	V.	v.	U.	-23/.	O.	O.	v.	0.
	0.						0.	
75	٥.	Ο.	0.	5579.	0.	Ο.	0.	0.
76	Ο.	0.	0.	901030.	0.	0.	0.	0.
79	962.8				0.6961			
80							0.	
	14.7	470 1	17/0 7	770770	70 4007	0.	ŏ.	~ ·
82							٥.	
83					О.		0.	
84							16.172	
86	0.	0.	0.	108612.	0.	0.	٥.	0.
88				3137.		٥.	0.	0.
90							o.	
91				951391.			o.	
95	1.5	114.5	1030.7	326/123.	216.4357	1038.077	2.956	288.8
77	O.	O.	Ο.	7071.	Ο.	O.	o. o.	O.
100	0.	0.	0.	643.	Ο.	٥.	0.	1973.6
104	2658.1	540.7	535.3	5393140.	0.0210	1.028	0.	2658.1
							0.237	
					78.1822		0.240	
							2.956	
100	باست عداد بحر	117.0	10001	020/120:	~ C \ C C C	1030.077	£.7UD	~4030.2
109			20/.0	2120100.	<i>U</i> .	Ų.	0. -0.279	o.
111	107.1	333.1	304.0	6437598.	4.1542	0.	-0.279	0.
112	o.	٥.	1428.4	45091.	0.	Ο.	0.	0.
113	O	0.	0.	5460108.	0.	0.	0.115E 19	Ο.
114	436.9	119.7	88.8	14740.	0.0162	0.624	0.	436.9
							0.	
							o.	
110	400.7	117.7	00.0	2/340:	0.0102	0.040	O.	. 450.7
							O.	
118	436.9	119.7	88.8	19274.	0.0162	0.660	0.	436.9
119	436.9	119.7	88.8	20182.	0.0162	0.660	0.	436.9
120	0.	0.	0.	4765.	0.	0.	O.	0.
122	0.	0-	0 =	4172183	0-	٥.	0.	0.
1 24	A 7	104 =	0/ F	720000 777700	0.0147	ň.	5.700	a a
405	4 - 2 - C	4 ± G + G	74.0	020700.	V.VIOZ	V.	0.700	A L 7 D
120	4/3.7	60/.4	1418.1	11193.	1.5335	V.628	0.	40/.7
130	O.	Ο.	0.	204412.	0.	0.	0.	Ο.
131	108.3	624.0	1341.0	99289.	5.8700	1.018	0.	108.3
132	108.4	623.8	1340.9	105122.	5.8633	1.019	O.	108.4
133	0.	0-	0-	203769	0.	0.	0.	0-
201	0. 1	o.	1525.2	7	0-	223.110	0.	o.
		-wr 10	an and almost the disco	*VF 98	-w* 88			-w- #-

A10-8



# Turbine Technology

SCHENECTADY, NEW YORK

PERFORMANCE TEST REPORT INTERMOUNTAIN POWER PROJECT UNIT NO.2

BY

P.G. ALBERT

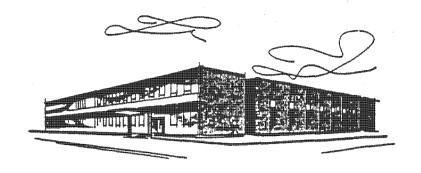
Tb.No.270T151 TC6F-30"LSB 2400 psig,1000/1000F,1.66/2.24/2.99"Hg ABS 820,000 KW 3600 RPM

DF87STG05

Class III

February 26,1988





# Turbine Technology Department

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Class III

February 26,1988



# GENERAL BELECTRIC

# TECHNICAL INFORMATION SERIES Title Page

di Mariana		•			
AUTHOR P.G. Albert	SUBJECT Full Scale ASME	NODF87STG05			
r.G. AIDELL	Performance Test	DATE 3/3/88			
TITLE		G.E. CLASSIII			
	ower Project Unit #2, 270Tl5l OP/1000F/1000F, 2.3" HgA	GOVT.CLASSONE			
REPRÓDUCIBLE COP Technical Repor Building 273, R	Y FILED AT t Library com 315, Schenectady, NY	NO. PAGES 16			
SUMMARY					
This report pre ASME performance results show the	sents the results obtained from e test conducted on the IPP uni at:	a full scale t #2. The			
- The turbine test heat rate at the guarantee load of 820,000 KW, rated conditions of 2400 psig/1000F/1000F, 1.66/2.24/2.99" Hg, and the contract cycle conditions is 7793.0 BTU/KW-HR, which is 0.3% better than guarantee. This excellent performance is consistent over the load range.					
- The maximum o	contract cycle generator output	corrected to			

- The maximum contract cycle generator output corrected to rated conditions is 872,781 KW, which exceeds the valves wide open output by 2.5%.
- The maximum test throttle flow at rated throttle steam conditions is 6,271,150 lb./hr., which is greater than the valves wide open throttle flow by 2.4%.

ASME test, full scale test, performance test, efficiency, Intermountain Power Project, IPP #2.

INFORMATION PR	EPARED FOR Steam Turbine-Generator Engrg. & Manufacturing Operations
TESTS MADE BY	Intermountain Power Project and General Electric Company
AUTHOR	P.G. Albert Paul 3/9/88
COMPONENT	Performance Engineering
APPROVED	John A. Booth, Manager - Performance Engineering Tokan A Front Micke
AUTHORIZATION, AND DISTRIBUTION	CLASS
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34	•
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# GENERAL ELECTRIC COMPANY

# TECHNICAL INFORMATION SERIES

NO. DF87STG05

#### I. INTRODUCTION

A full scale ASME performance test was run on the IPP #2 unit to determine the overall performance of the turbine relative to its guarantee. The tests were conducted through the cooperative efforts of General Electric Company and Intermountain Power Project.

The turbine-generator unit was intially synchronized in February 1987. Enthalpy drop efficiency tests were run on the high pressure (HP) and intermediate pressure (IP) turbines after startup to establish the efficiency levels for these components. The establishment of the startup performance level as soon as possible after initial synchronization is a necessary prerequisite to the running of an ASME full-scale acceptance test. This step provides the basis for identifying the presence of performance deviations which may occur in the time period before a full-scale test can be run.

In May of 1987, the full-scale ASME performance test was conducted. The initial test point was performed for the primary purpose of instrument checkout, data taker training, isolation verification, and determining the efficiency of the HP and IP turbine sections. This data showed the HP turbine efficiency to have deteriorated 1.4% since startup and the IP turbine efficiency to have deteriorated 0.2%. Despite this deterioration, the performance test was conducted as originally planned. A series of nine full-scale ASME test points were then conducted from May 11 through May 16, 1987. This report presents the results of the full-scale performance test as well as the startup enthalpy drop test.

## IL INSTRUMENTATION

The instrumentation and measurements required for a full scale test are described in detail in PTC-6 1976. A brief summary of the application of PTC-6 to the IPP #2 unit follows:

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#### A. Description of Unit

The turbine is a tandem compound 3600 RPM design with a single flow HP turbine, a double flow IP turbine, and a six flow low pressure turbine with 30" last stage buckets. It is a single reheat design with rated steam conditions of 2400 psig/1000F/1000F and a nameplate rating of 820,000 KW at 1.66/2.24/2.99" HgA exhaust pressure. A cross-section of the HP turbine is given in Figure 1A, the IP turbine is shown in Figure 1B, and one of the three low pressure sections is shown in Figure 1C.

A schematic of the the turbine and feedwater cycle is given in Figure 2. The locations and types of measurements which were made are identified on this figure.

#### B. Pressures, Temperatures, Flows

Most of the instrumentation for the test was provided by the General Electric Company. Temperatures were measured using calibrated chromel constantan thermocouples with continuous leads from the hot junction to an electronic (real ice) ice bath. Per PTC-6 recommendations, temperatures which have the most influence on the test results were measured at two different points, close together, and the mean of the readings was considered to be the temperature of the fluid.

Transducers were used for the measuring the various pressures as well as the differential pressures across numerous flow elements. Many pressures were multiplexed to one transducer through the use of scanivalves. This justified the use of expensive, ultra high accuracy Ruska quartz bourdon tube transducers. Rosemount and Gemac transducers were used to measure differential pressures on secondary flow elements and

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Heise pressure transducers were used for some static pressure measurements. Prior to the start of the test, an in-place calibration of transducers was performed.

The condensate flow to the deaerator was measured using an ASME primary-flow section which had a throat tap nozzle with a Beta ratio of 0.423 and a throat diameter of 9.842". Calibration of this flow section was completed by Alden Research Laboratory (ARL Report No. 112-84/C354) and the results are show in Figure 3. This flow section, which is the property of IPP, was inspected by IPP personnel a number of weeks prior to the test and found to be clean and undamaged. After completion of the test, GE recommended that the nozzle be inspected to verify that the nozzle remained clean during the test. However, the outage schedule never permitted inspection of this nozzle soon after the test. The differential pressure across the nozzle was measured on both sets of taps with Ruska DDR transducers. The temperature-controlled quartz bourdon tube transducers have an accuracy of 0.02% of reading plus 0.02% of full scale.

A calibrated flow section having a throat tap nozzle with a Beta ratio of 0.45 was used to measure the extraction steam flow to each of the two boiler feed pump turbines. The main steam attemperation spray flow was measured with a station pipe tap nozzle which was inspected by IPP prior to the test using the inspection port. A station orifice was used to measure the combustion gas reheat return to the deaerator. The feedpump injection flows where measured with six station orifices, one for each of the two main boiler feedpumps, one for the startup boiler feedpump, and one for each of the three booster boiler feedpumps. The feedpump seal return flows were measured with two calibrated turbine-meter flow sections which were provided by GE. Numerous flows in the steam seal system (see Figure 4) were measured with station orifices and forward-reverse tubes. No reheat attemperation spray flow or air preheat flow was used during the test.

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### C. Electrical Measurement

The generator electric load measurements were obtained using the following apparatus:

Electrical Apparatus Used	Serial No.	Phase
Current Transformers (customer's property)		
Potential Transformers (GE Property)	G425553	A
Type: JVS-150	G414871	В
Rating: 13800/120, 3000 VA, 60 Hz	K135196	C
Instruments (GE Property)	30809740	A
Precision Watthour Meters	30809742	В
Type: IBL-10 (Modified)	30809743	С
Rating: 2.5 Amp, 120 Volt, 60 Hz		

The precision watthour meters and the associated readout equipment were used to determine generator output of each of the three phases. These instruments were supplied by the General Electric Company along with a test cabinet for making all necessary electrical connections. The measuring setup was located in the control room.

The precision watthour meters were calibrated in Schenectady at the standards laboratory of Upstate New York Instrumentation Services, General Electric Company. During the calibration and the test, these meters operated in a temperature—controlled cabinet.

The potential transformers were calibrated at the General Electric Somersworth, New Hampshire plant. These calibrations provided the phase angle correction factors and the ratio correction factors for the potential transformers. The secondary burden consisted solely of our instruments. All transformers were grounded at their secondaries. During the testing, steam conditions and throttle flow were held as steady as possible to maintain steady generator load.

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During each test, revolutions of the IBL-10 watthour meters were counted by electronic counters. The digital readout of these counters and the timer was photographed or recorded at precise 15-minute intervals. Phase voltages and currents were recorded by the data acquisition system. These values were used to determine the average armature current of each phase, average line-to-line voltage, and the power factor of the unit during each test. The value of generator hydrogen pressure was recorded during each test using the station instrumentation.

## D. Data Acquisition

During the ASME performance test, a Hewlett-Packard 1000 data acquisition system was used for collection and reduction of test data. The computer has a 0.5 megabyte core memory with a 64 megabyte disc and is housed in a mobile trailer. For convenience, the mobile trailer was located on the turbine deck for the duration of the test.

Use of the system eliminated the need for about 20 data takers, thereby reducing the testing cost for the customer. In addition, the rate of recording data was increased and thus reducing data scatter uncertainty. Using both pressure multiplexing and computer input multiplexing, the scan time was about 3.7 minutes. The more important variables such as primary flow were read more frequently (once every 28 seconds).

During a test point, the system allowed complete visibility of the data as it was logged and stored on magnetic tape. Upon completion of a test point, a hard copy of the raw data was printed, along with corresponding scan times and averaged values converted to engineering units. The system could also be used to perform heat balance calculations for determining detailed turbine performance results as well as information on the performance of other components of the cycle.

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#### E. Cycle Isolation

For all test points, a number of valves were closed to prevent unaccounted-for flows from entering or leaving the test cycle or bypassing any cycle component. Many lines were isolated by closing two isolation valves and opening a drain between the valves to verify no leakage. For steam line drains to the condenser, the drain line temperature near the condenser was checked to verify that the single isolation valve was not leaking. During the initial test, some drain valves were found to be leaking, but these isolation problems were corrected by closing additional drain line valves.

The No. 1 and No. 2 low pressure heater continuous vents were not isolated to avoid the heater from becoming air bound during a test point. These heater vent leakage flows were estimated to be insignificant to overall performance and no correction was made in the heat balance calculations for this performance loss.

The unaccounted-for flow leaving the cycle was about 0.1% of the valve wide open throttle flow. Some identified sources for this leakage were the deaerator drain and two relief valves from the final feedwater line.

#### III. CALCULATIONS

Ten test points were run during the period May 9 through May 16, 1987 which covered three valve best point operating conditions: second, third, fourth, or VWO condition. Test point 1 was considered a preliminary test whose main objective was to provide a check on the cycle isolation and instrumentation. Several isolation deficiencies and instrumentation problems were discovered and corrected. Test points 2, 4, 5, 6, 7, 8, and 10 were run with the cycle in the design mode of operation. Test points 3 and 9 were run with the total flow from the heater #2 drain going to the condenser. Test point 8 was run at VWO over

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pressure. A sum mary of test conditions for these test points is given in Figure 5.

The test data which was recorded and stored on a magnetic tape during each test point was printed, along with averaged values converted to engineering units and corrected for water legs, barometric pressure, and instrumentation calibration. The data was then posted on a copy of the instrument diagram (Figure 2) and reviewed for errors, inconsistencies, completeness, etc. An example of a completed posting diagram developed for test point 6 is shown in Figure 6.

The electrical load was calculated from the data obtained from the measurements described in Section II-C by the formula:

Load = Rev. x 60 min./test time (min.) x K x WHMCF x CTRCF x PTRCF x CTMR x PTMR

where:

K = Watthour Meter Constant

WHMCF = Watthour Meter Correction Factor

CTRCF = Current Transformer Ratio Correction Factor

PTRCF = Potential Transformer Ratio Correction Factor

CTMR = Current Transformer Marked Ratio

PTMR = Potential Transformer Marked Ratio

These calculations are done for each phase and the sum of them is the total generator load. Generator data for the average armature current of the phases, the average line-to-line voltage, and the hydrogen pressure are listed in Table I. The test generator load and power factor (PF) are listed in Table II. Comparisons were made between the electrical measurements made by General Electric and the readings obtained from the station computer. These results, given in Table III, show computer point TGBPKO to read within 0.1% of the test electrical load equipment and computer point COAXIO read about 0.25% less MW output. The generator losses are shown in Figure 7.

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### Table I Generator Data

Test No.	Avg. Armature Current of 3 Phases	Avg. Line-To-Line Voltage	H <sub>2</sub> Pressure Psig
2	19429	25772	64
3	13410	25736	58
4	19505	25743	64
5	17960	25644	61
6	19554	25699	64
7	17428	25634	62
8	20213	25608	63
9	13614	25532	63
10	17818	25618	63

### Table II Generator Load

Test No.	Date	Time	KW	PF
2 3 4 5 6 7 8 9	5/11/87 5/13/87 5/13/87 5/14/87 5/14/87 5/15/87 5/15/87 5/16/87	14:15 - 16:15 04:30 - 06:30 01:45 - 13:30 03:30 - 05:30 08:30 - 10:30 03:15 - 05:15 08:30 - 10:30 04:15 - 06:15	855960 592031 859850 785980 860755 775096 898356 599736	0.987 0.991 0.989 1.000 0.989 1.002 1.002 0.996
10	5/16/87	13:30 - 15:30	789272	0.998

# Table III

Test No.	GE Measured (MW)	Station Computer (MW) TGBPKO	% Diff.	Station Computer (MW) COAXIO	%Diff_
2	855.960	855.17	-0.09%	853.85	- 0.25%
3	592.031	592.19	0.03%	590.85	-0.20%
4	859.850	859.82	0.00%	857.92	-0.22%
5	785.980	785.66	-0.04%	783.30	-0.34%
6	860.755	860.67	-0.01%	858.63	-0.25%
7	775.096	774.50	-0.08%	777.20	0.27%
8	898.356	spinet state	****	appa pinta	centes
9	599.740	599.12	-0.10%	598.31	-0.24%
10	789.270	787.51	0.03%	786.57	-0.34%

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The performance of the test cycle was calculated by supplying the measurements identified on the posting diagram for each test point to a computerized heat balance model of the turbine cycle. A sample calculation can be found in the ASME PTC-6 Appendix A to Test Code for Steam Turbines. All calculations have been performed using ASME steam properities. The computer output for the test cycle calculations is contained in Appendix A. The output for each test point contains detailed turbine performance results as well as information on the heaters, pumps, and other components of the cycle. The information contained in Appendix A for test point 6 is summarized on the test cycle heat balance diagram of Figure 8.

The expansion line end point (ELEP) was calculated by subtracting the appropriate exhaust loss obtained from the curve given in Figure 8A from the measured used energy end point (UEEP). It is noted that the exhaust loss curve shown in Figure 8A is based on data obtained from numerous tests which were conducted on similar turbines with 30" last stage buckets and also from data obtained on laboratory models.

With the test performance characteristics of the turbine established, the contract cycle analysis was then conducted. The contract cycle analysis provides the final results which are used to compare the test performance with the guarantee performance of the turbine. Contract cycle analysis restores the performance of all the cycle components except the turbine to their respective design values while maintaining the test performance characteristics of the turbine. The test characteristics for the turbine and the steam conditions taken from test cycle are:

- 1. High pressure turbine efficiency
- 2. Reheat turbine efficiency (UEEP)
- 3. Packing flows and rotor cooling steam flow
- 4. Stage flow functions
- 5. Hot extractions \*
- 6. Throttle flow
- 7. Throttle pressure
- 8. Throttle temperature
- 9. Reheat temperature
- 10. Exhaust pressure
- \* Hot extractions refer to the difference between the test extraction enthalpy and the corresponding stage test expansion line enthalpy.

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The exhaust loss given by Figure 8A was used in the contract cycle analysis calculations to relate the UEEP and ELEP enthalpies. A method of performing contract cycle calculations is shown in the ASME PTC-6 Appendix A to Test Code for Steam Turbines.

Contract cycle calculations were performed on eight test points which covered the three valve best point operating conditions: second, third, fourth, or VWO conditions. The flows, pressures, enthalpies, output, and heat rate obtained in the contract cycle analysis are shown on the heat balance diagrams of Figures 9A-9H for test points 2,3,4,5,6,7,9, and 10, respectively. Note that the turbine auxiliary power requirements of 175 KW's have been accounted for by including them in the fixed losses. The test cycle fixed losses were 4353 KW and the contract cycle fixed losses were 4528 KW. The correction of output and heat rate to design steam conditions is discussed in Section IV-4.

#### IV. RESULTS

A summary of pertinent results from both the test cycle and the contract cycle analysis follows:

# 1. HP Turbine Efficiency

The efficiency of the HP turbine was measured \* during each test point. The results are plotted on Figure 10 as a function of throttle flow ratio (TFR) which is the ratio of the throttle flow to the valves wide open (VWO) throttle flow. The efficiencies and the TFR have been corrected to rated throttle conditions of 2400 psig/1000F. The efficiencies obtained from the design heat balances are included. For the VWO points (test points 2,4,6, and 8) the test efficiency is 2.0% better than the design VWO heat balance. This is worth an estimated 0.3% in turbine heat rate.

\* Appendix D describes the measurement and calculation of HP and IP efficiency.

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The efficiency of the HP turbine deteriorated since the initial performance was established at startup. This is shown in Figure 11, which includes the results of the data taken during the enthalpy drop tests and the full-scale tests. The efficiency established at startup was 1.4% better than the full-scale test. This loss of HP efficiency is worth about 0.25% in turbine heat rate. The ratio of the first stage pressure to throttle pressure for a given valve point has also decreased from the initial test obtained at startup. This could indicate a decrease in flow capacity due to a restriction in the first stage or valves, or an increase in leakage flow from the first stage such as cooling steam flow and N2 packing flows.

# 2. IP Turbine Efficiency

The efficiency of the IP turbine was also measured during each test point. This efficiency is defined from ahead of the combined reheat valves to the LP bowl. The results obtained during the full-scale test are plotted in Figure 12, along with those previously obtained from the enthalpy drop test. The IP turbine efficiency showed about 0.2% deterioration from what was established at startup.

### 3. Reheat Turbine Efficiency

The reheat turbine efficiency reflects the combined performance of the IP and low pressure sections. It is measured from the initial conditions defined by the pressure just ahead of the Combined Intercept Valves (CIV's) and bowl enthalpy to the endpoint conditions defined at the exit of the low pressure turbine. Unlike the HP and IP efficiencies discussed above, reheat efficiency can only be determined by performing a full-scale test since a heat balance around the entire turbine in required to determine the used energy endpoint (UEEP) at the low pressure turbine exhaust. Hence, no data for the reheat efficiency was available from the previous enthalpy drop tests which were run prior to the full-scale test.

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The results of the reheat turbine UEEP efficiency are presented in Figure 13. These results have been corrected to 1000F reheat temperature. The level of efficiency indicated by the test curve is equal to the design curve.

Results for the reheat turbine efficiency based on the expansion line endpoint (ELEP) are shown in Figure 14. The annulus velocity used to calculate and plot the ELEP efficiency was based on the three exhaust pressures obtained in each of the three hoods rather than the combined average exhaust pressure for all three hoods. For each test point, the exhaust loss was determined for each of the three hoods and the average exhaust loss was then used to calculate the ELEP efficiency. The test level of performance is better than the design level of performance.

### 4. Output and Heat Rate

#### A. Test Cycle

The test value of the major variables which affect turbine and cycle performance are shown in Appendix C along with the test cycle results for output and heat rate. This data has been used in conjunction with the correction curves for throttle pressures, throttle temperature, reheat temperature and exhaust pressure, which are given in Appendix B, to obtain values for the test output and heat rate corresponding to the rated conditions of 2400 psig, 1000/1000F, 1.66/2.24/2.99 HgA, 0.9 power factor, and H<sub>2</sub> pressure of 63 psig. The final values for test output and heat rate at rated conditions have been plotted in the form of test heat rate versus test load in Figure 15. The design curve shown is based on the design heat balances which include 1% cycle makeup and a heat rate definition with heat input by the condensate pump and for 0.1% boiler blowdown flow.

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## B. Contract Cycle

As noted earlier in Section III, the results of the contract cycle analysis provided the test turbine performance with all other components in the cycle performing at their respective design performance levels. The contract cycle analysis provides the results for turbine output and heat rate which are used to compare the test performance with guarantee. Table IV contains a summary of the contract cycle results for output and heat rate. Both have been corrected to rated conditions using the same correction factors listed in Appendix C. The corrected data is plotted in Figure 16 which also contains the design heat rate curve.

The contract cycle test heat rate was compared to the quarantee value using the method outlined in the turbine-generator contract. First, the equation for the straight line between the design heat balance heat rates at the third valve point and valves wide open was determined. Second, the difference between the heat rate at 820,000 KW from the straight line equation and the specified contract 820,000 KW guaranteed heat rate was calculated to be Third, the test heat rate at 820,000 KW was 6.9BTU/KW-HR. calculated from a straight line equation between the test heat rates at the third valve point and the valves wide open. The resultant corrected test heat rate at 820,000 KW was then determined by subtracting the 6.9 BTU/KW-HR obtained in step 2 from the straight line interpolation of the test heat rate obtained in step 3. corrected test heat rate is 7793.0 BTU/KW-HR and guarantee value is 7816 BTU/KW-HR (See the guarantee heat balance 481HB111 shown in Figure 17A). The test value is better than guarantee by 23.0 BTU/KW-HR or 0.3%. The test heat rate is considerably better than the design level over the entire tested load range. difference is primarily attributed to the better stage performance of all turbine sections relative to design.

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Using the startup levels of HP and IP efficiency, the corrected contract cycle heat rates would have been 0.55% better than guarantee.

The VWO test output of 872781 KW (Average of test points 2,4, and 6) exceeds the guarantee value of 820,000 KW by 6.4% and design VWO value by 2.5%. The measured VWO throttle flow corrected to 2400 psig/1000F is 6,271,150 LB/HR (average of test points 2,4, and 6) which exceeds the design VWO throttle of 6,122,730 LB/HR by 2.4%.

Summary - Contract Cycle Analysis
Generator Output

Test <u>Point</u>	Contract Cycle * Output	Contract Cycle Output** Corrected to Rated Conditions
2	843805 KW	87 <b>4</b> 951 KW
3	586602 KW	602734 KW
4	8 <b>47</b> 509 KW	872168 KW
5	775180 KW	795887 KW
6	848153 KW	371223 KW
7	763183 KW	788467 KW
9	593082 KW	594212 KW
10	777947 KW	794286 KW

#### Heat Rate

Test Point	Contract Cycle * Heat Rate	Contract Cycle Heat Rate** Corrected to Rated Conditions
2	7958.9	7767.2
3	8084.6	7916.5
4	7984.9	7791.4
5	7977.7	7812.4
6	7951.3	7777.4
7	7996.9	7811.6
9	7872.3	7928.7
10	7897.2	7808.4

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- \* Calculated for the test conditions of throttle pressure and temperature, reheat temperature, and exhaust pressure. The power factor and hydrogen pressure were 0.90 and 63 psig, respectively. Makeup of 1.0%.
- \*\* The corrections used for throttle pressure, throttle temperature, reheat temperature, and exhaust pressure are listed in Appendix C.

# 5. Stage Flow Functions

The flow function for a stage is defined by the relationship:

Stage Flow Function =  $Q/(A\sqrt{P/v})$ 

where:

Q = Flow to the following areas

A = Stage nozzle area

P = Stage shell pressure

v = Specific volume at the stage shell pressure and temperature

The flow function should have a constant value which is usually independent of load. Plots of this function will reflect any errors that may exist in the measurement of flow, pressure, or temperature at a specified point in the cycle. Its consistency is a measure of the precision of the test.

Plots of the flow functions calculated for those locations in the turbine where pressures and temperatures were measured (see Figure 2) are given in Figures 19-28. Generally, the values from each test point line up very well for each respective location demonstrating good consistency and, therefore, good precision.

The flow functions obtained for the positions in the HP turbine (Figures 19 and 20) exhibit a positive slope with flow to the following stage (i.e., load). This relationship is common to other large single-flow fossil, high pressure turbines. The remaining plots contain the

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results for locations in the IP and LP turbines. The first stage pressure has been plotted versus throttle flow in Figure 18.

# 6. Packing Flows

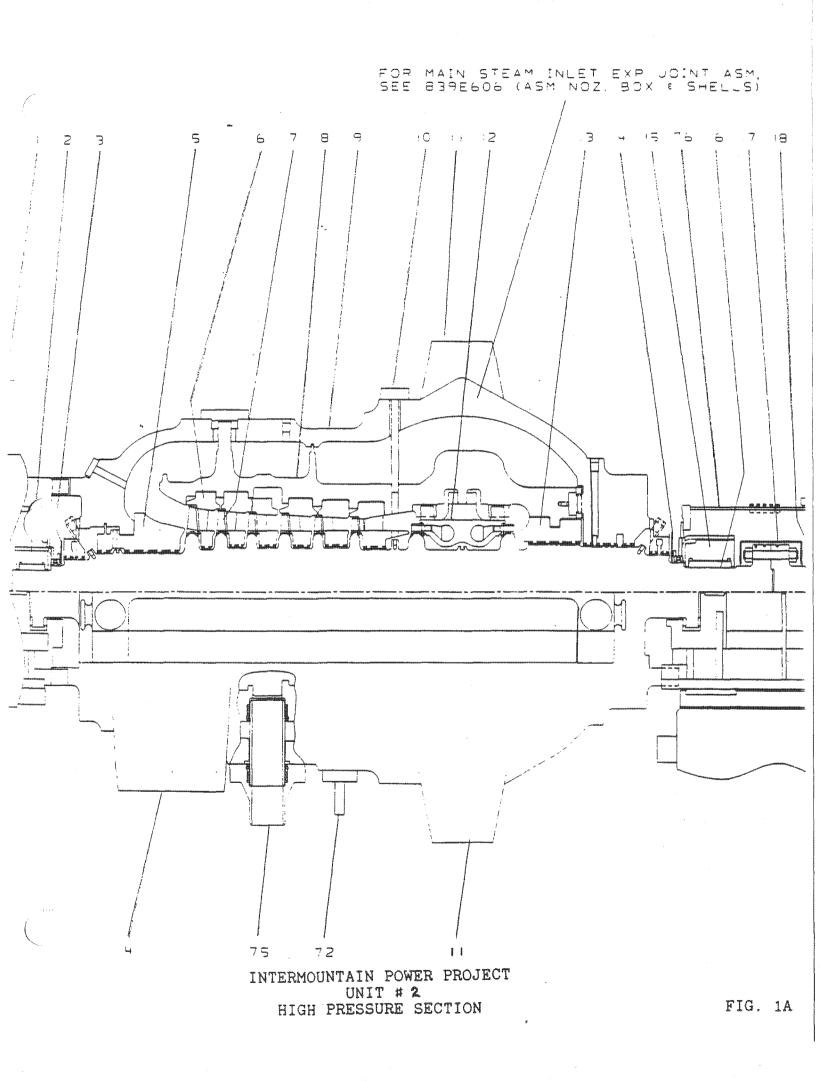
The turbine shaft packing flows were measured (see Figure 2) during the ASME performance test. The more significant flows are plotted in Figures 29-34. The HP turbine high pressure packing flows are plotted versus throttle flow in Figures 29 and 30 while the low pressure packing leakoff flows are shown in Figures 31 and 32. The IP turbine shaft packing flows to the steam seal header are shown in Figures 33 and 34.

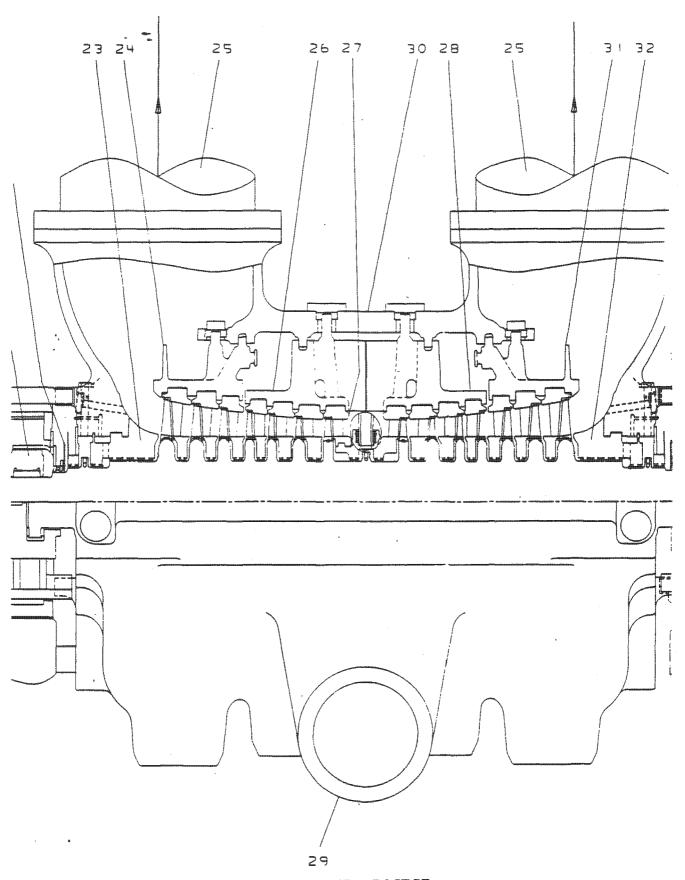
The packing flow constants determined from these test results have been used in the contract cycle calculation. However, packing flows have only a small effect on heat rate.

# V. CONCLUSION

The IPP #2 turbine-generator unit is 23.0 BTU/KW-HR or 0.3% better than guarantee at the guarantee output of 820,000 KW. The performance level of the unit is considerably better than design over the entire load range. The maximum contract cycle KW output at rated conditions is 872,781 KW. This exceeds the design VWO value of 851,733 KW by 2.5%. The maximum test throttle flow at rated steam conditions is 6,271,150 lb/hr., which is greater than the valves wide open (VWO) throttle flow of 6,122,730 lb/hr by 2.4%. The HP turbine section efficiency is 2.0% better than design at VWO, while at startup, it was 3.4% better than design. The reheat turbine efficiency, which reflects the combined performance of the IP and low pressure turbine sections, is on the average 0.2% better than design when corrected to rated reheat temperature.

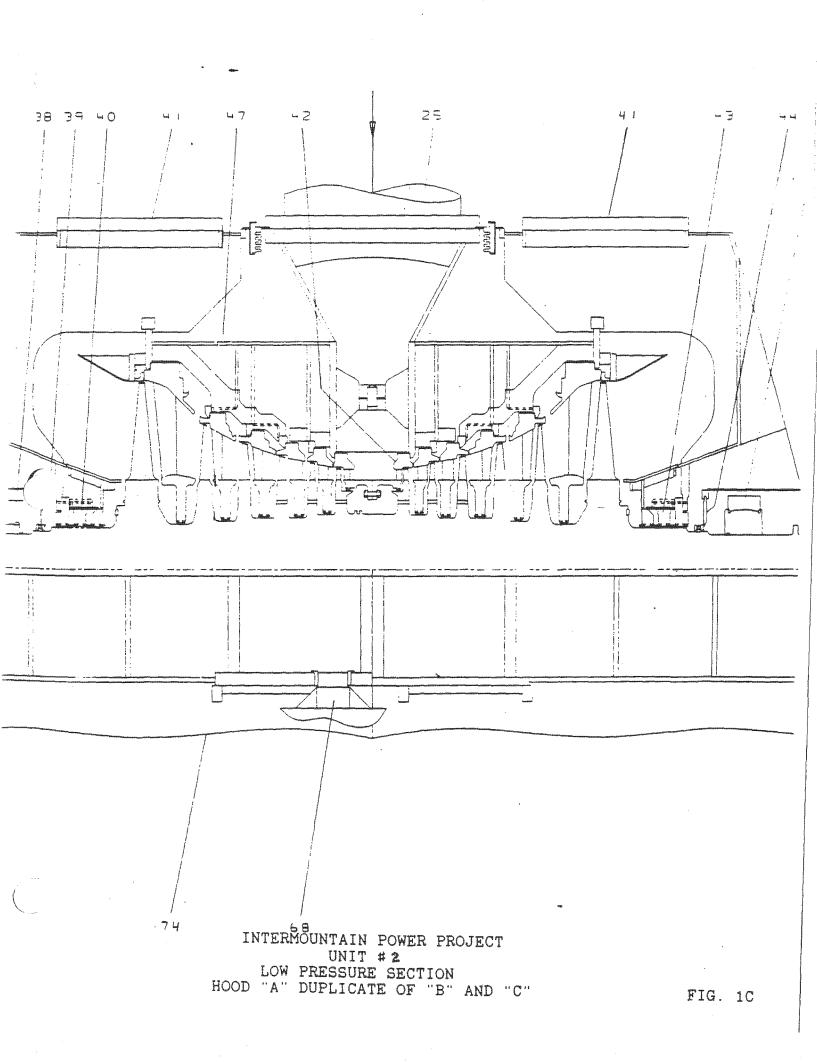
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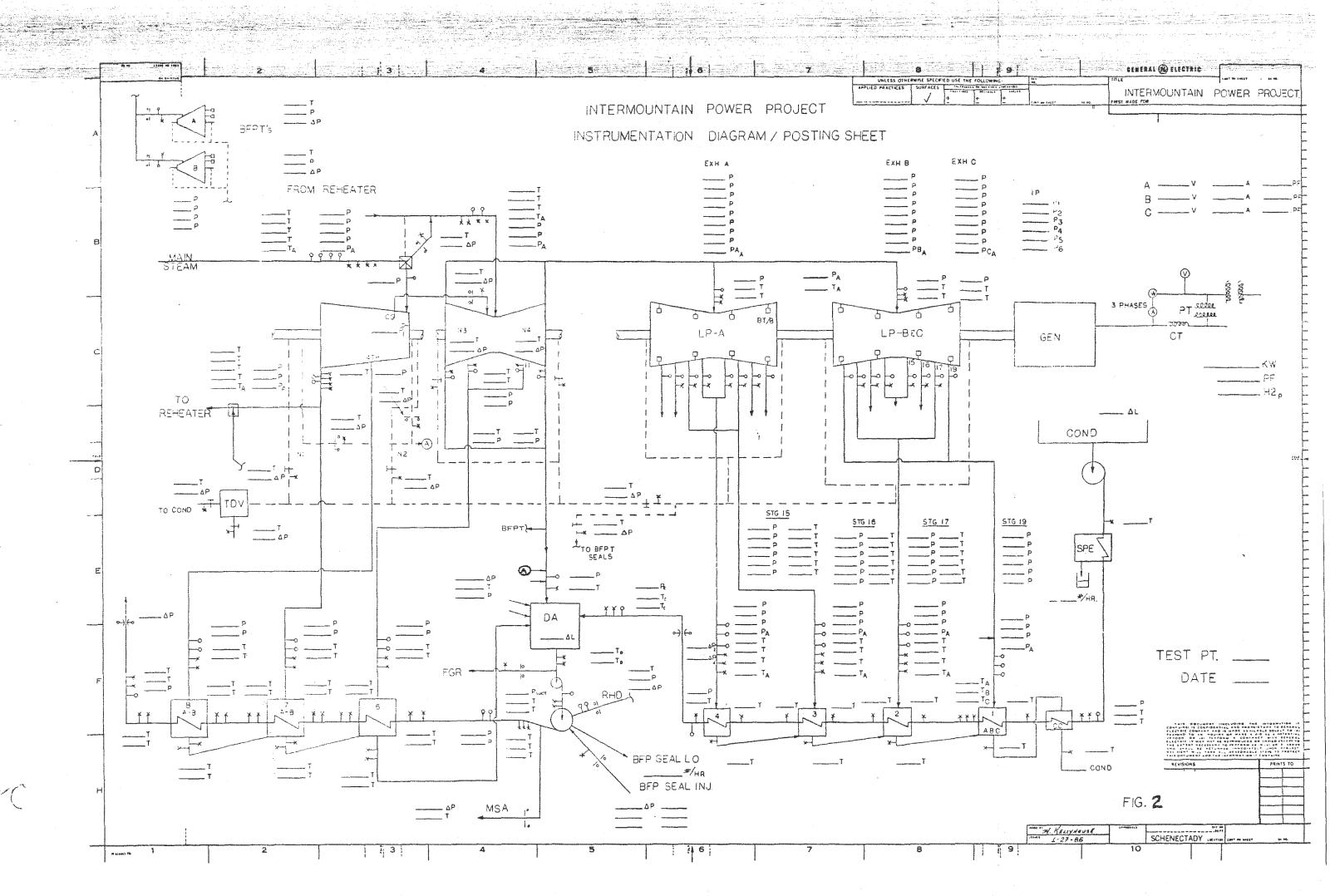


INTERMOUNTAIN POWER PROJECT
UNIT # 2
INTERMEDIATE PRESSURE SECTION

FIG. 1B



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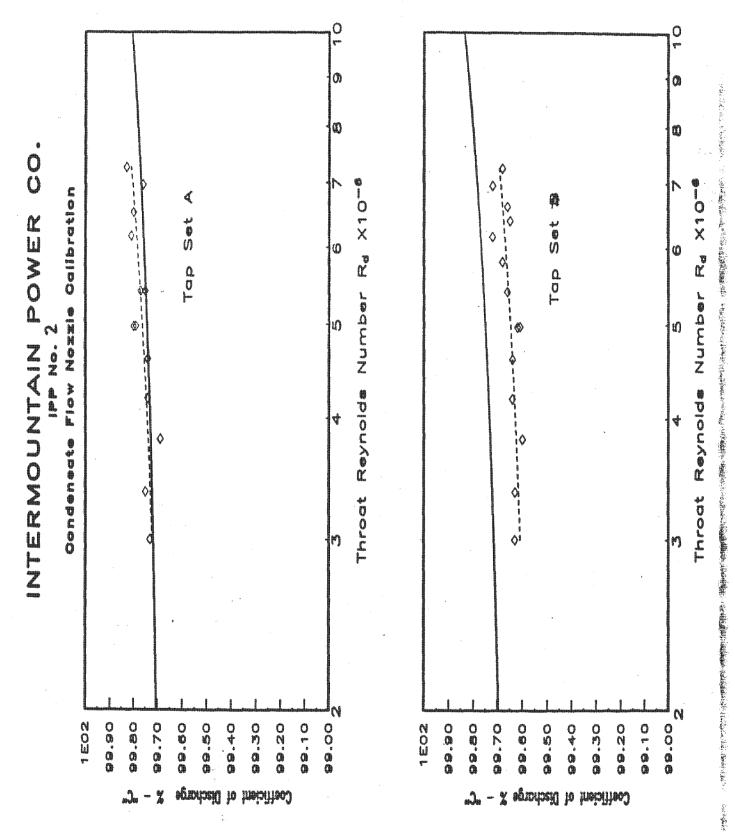
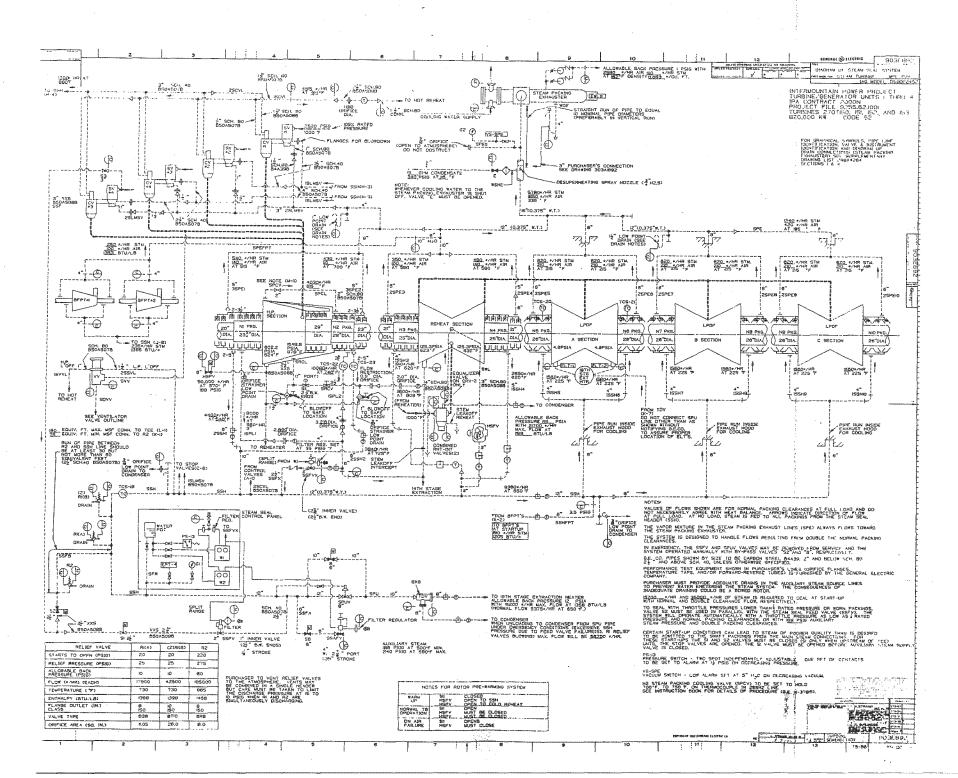
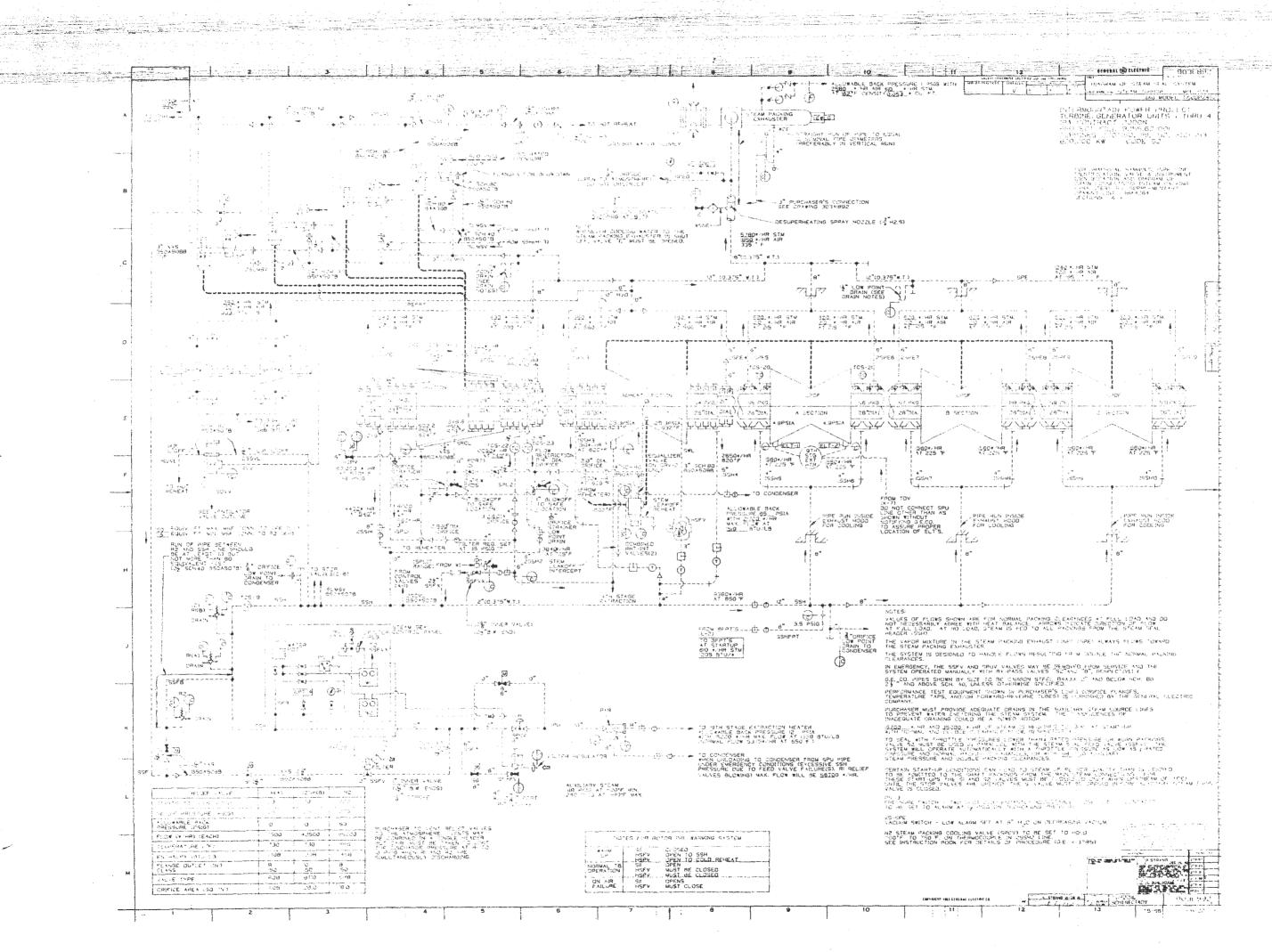


FIG. 3

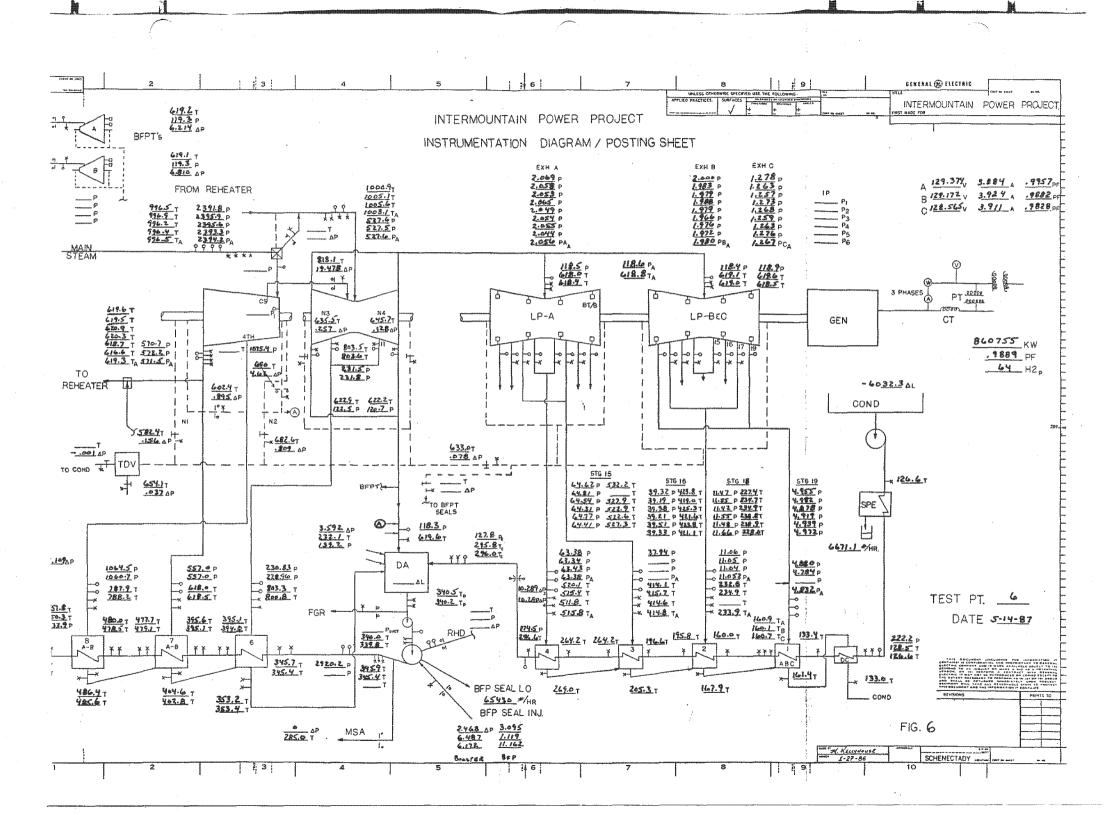


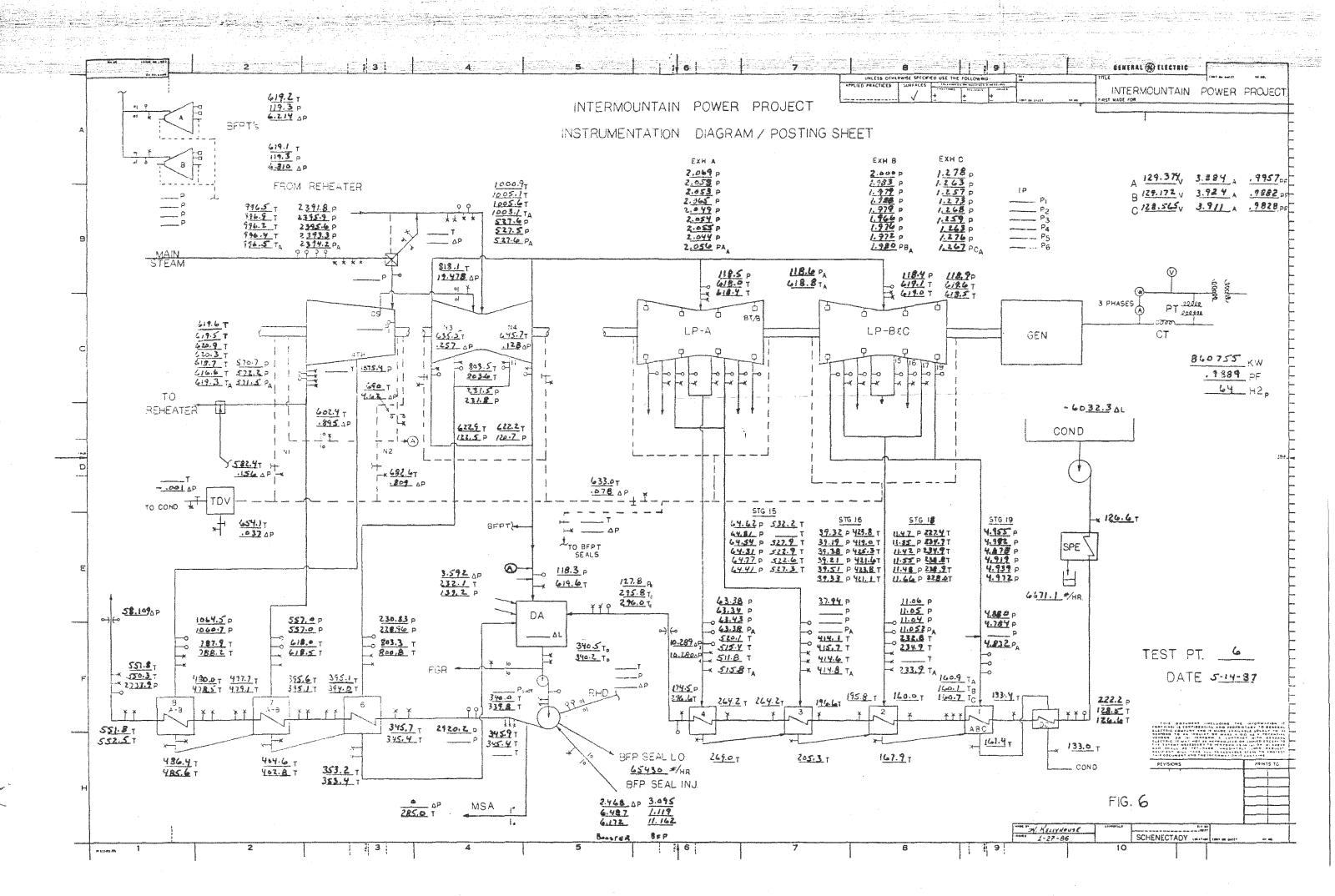


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### SUMMARY OF TEST CONDITIONS

TEST PT.	2	3	4	5	6	7	8	9	10
VALVE PT.	VHO	2nd	V <del>N</del> O	3rd	VHO	3rd	VHO	2nd	3rd
LOAD (MM)	855.96	592.03	859.85	785.98	860.76	775.10	898.36	599.74	789.27
THROTTLE FLOW (LB/HR)	6183909	4056100	6220163	5570279	6224013	5477861	6496919	3978528	5527099
THROTTLE PRESS. (PSIA)	2384.1	2399.8	2394.0	2393.8	2394.2	2388.9	2477.1	2393.3	2382.4
THROTTLE TEMP. (F)	1004.9	1007.2	1000.8	1001.5	996.5	1006.6	988.2	1008.8	1001.7
FIRST STAGE PRESS.	1918.0	1235.5	1926.2	1714.3	1927.3	1689.8	1992.9	1212.3	1698.8
HOT REHEAT PRESS.	521.4	354.0	526.1	475.0	527.6	467.6	544.5	348.7	473.0
HOT REHEAT TEMP.	1000.20	1001.30	1009.20	1006.20	1003.10	1004.30	996.30	1001.60	1007.50
COLD REHEAT PRESS.	566.0	384.3	571.2	514.8	571.5	507.0	590.0	378.4	512.7
COLD REHEAT TEMP.	625.1	566.8	623.0	606.1	619.3	607.3	612.1	565.5	606.5
LP BOML PRESS.	118.5	81.0	118.9	107.5	118.6	106.1	122.7	79.5	107.5
CROSSOVER TEMP.	617.2	621.2	623.6	622.9	618.8	621.5	612.8	622.1	624.6
LP EXH. PRESS. ("HG)	1.936	1.510	1.871	1.671	1.768	1.725	1.569	1.013	1.452
FINAL FW TEMP.	552.1	508.5	551.9	540.9	551.6	539.1	554.3	506.5	540.7

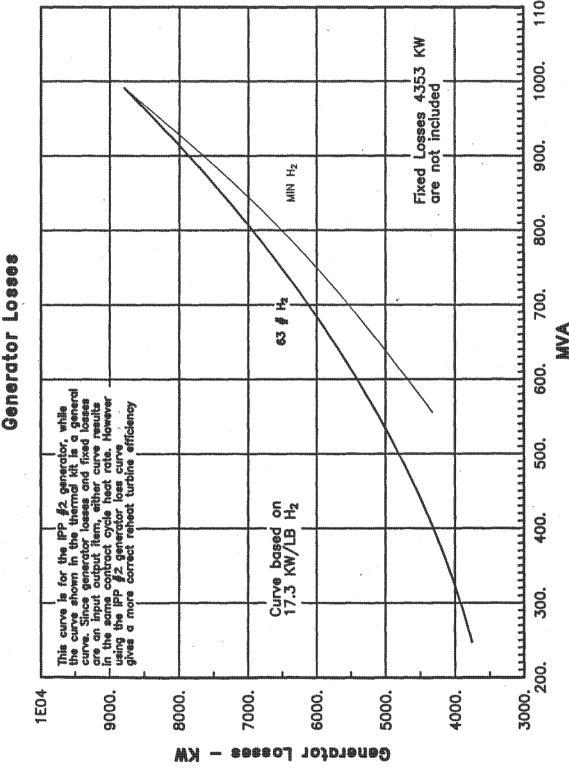




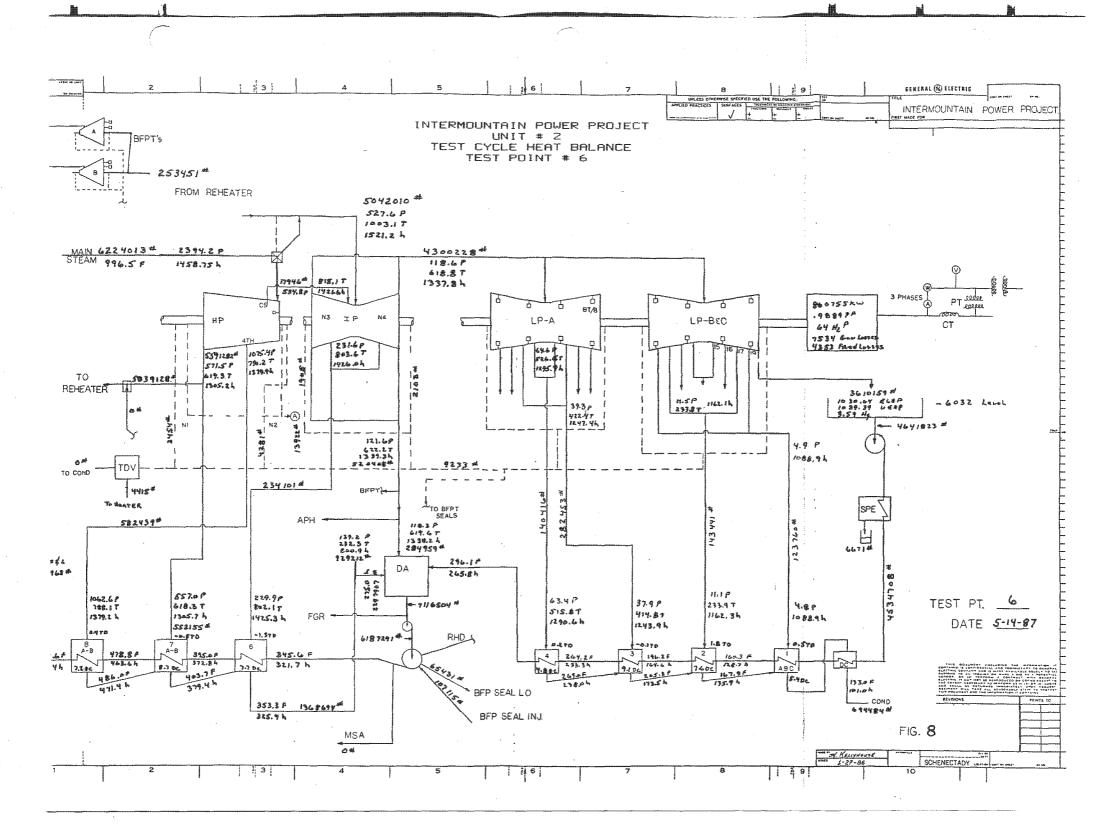
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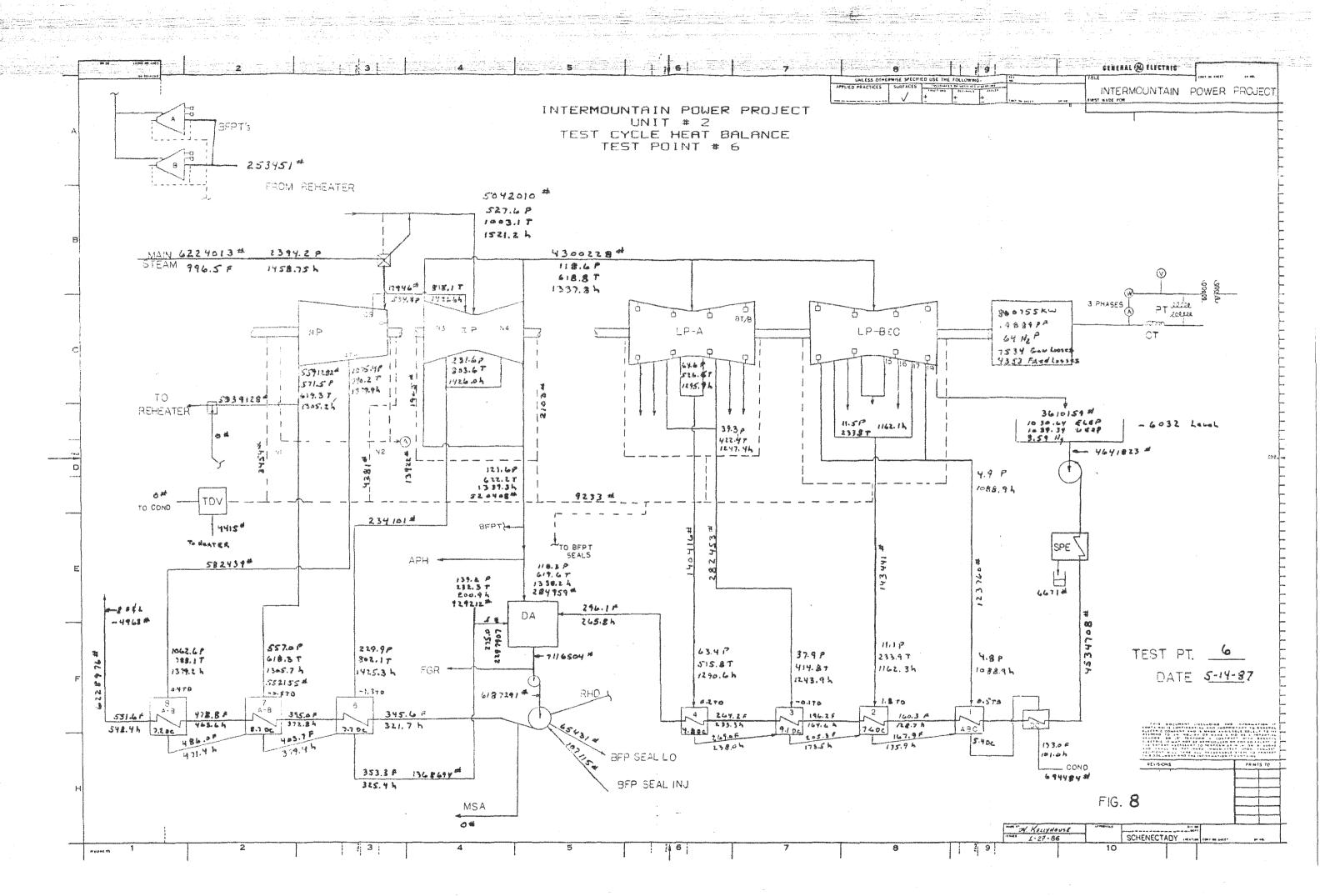
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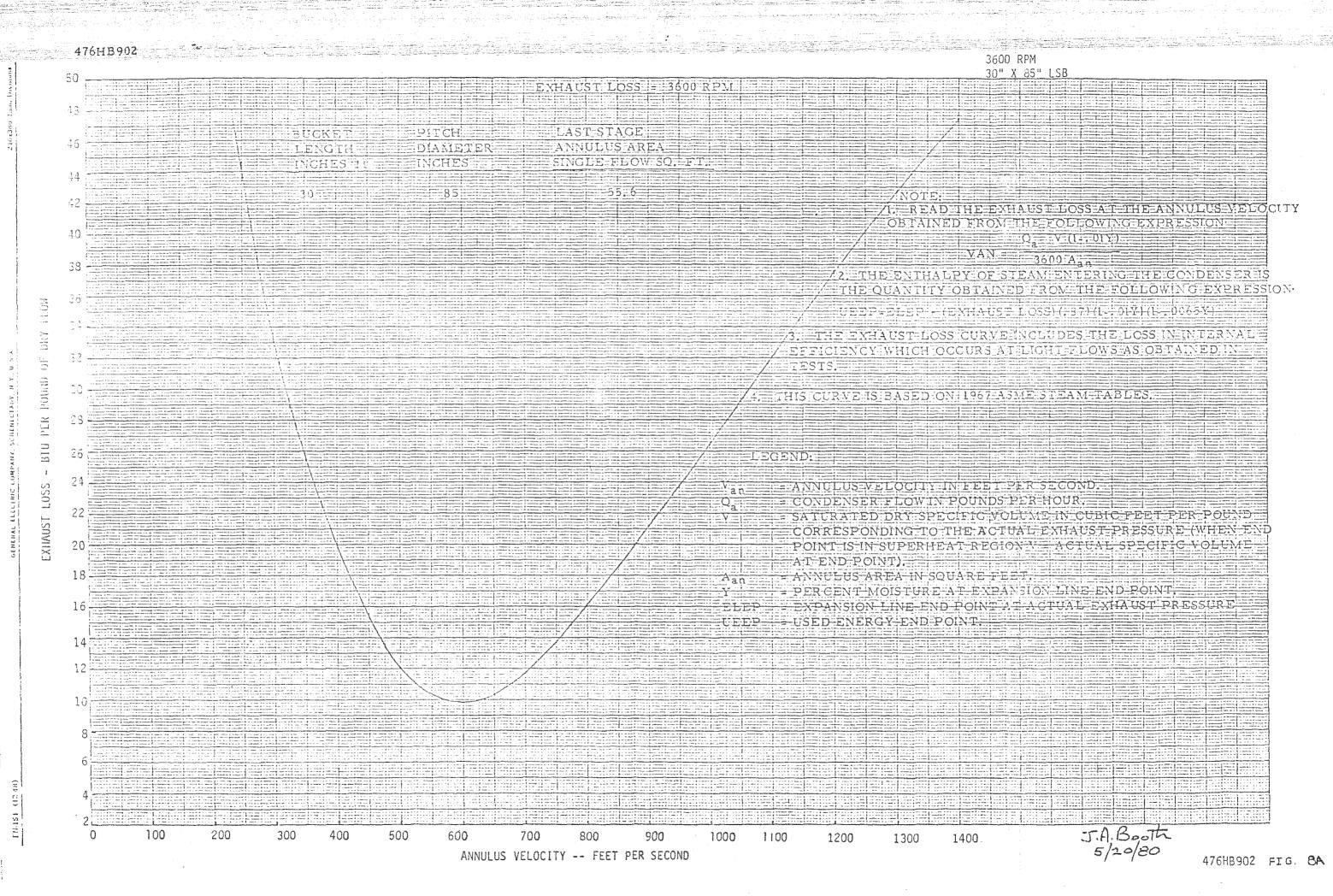


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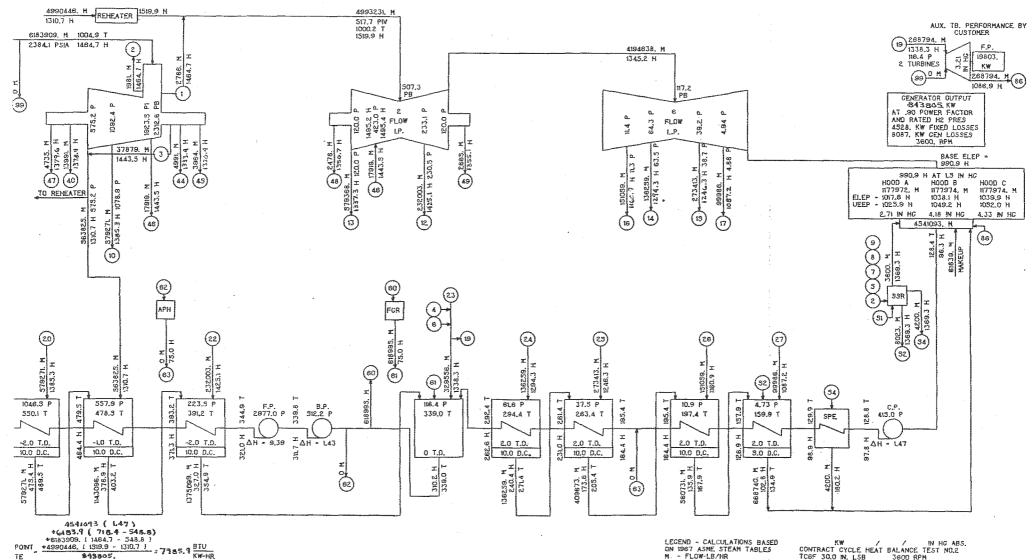
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### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

### CALCULATED DATA - NOT GUARANTEED

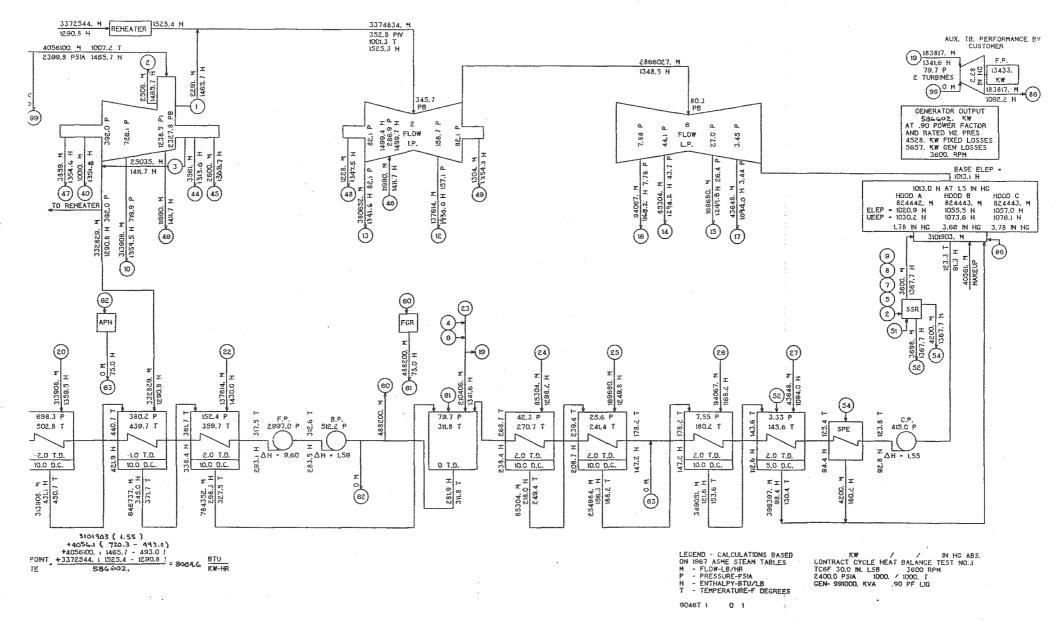
RATING FLOW IS 5979039, M AT INLET STEAH CONDITIONS OF 2412,2 PSIA AND 1000.0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES. SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH HA FRECT THE FLOW, THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW HANTING FLOW PLUS S.O PERCENT) OF 8278012. M THE EQUIVALENT DESIGN FLOW AT 23841 PSIA AND 1004.9 T IS 8183893. 4 . THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBING-CEMERATOR AUXILIARIES HAS BEEN DEDUCTED.



CONTRACT CYCLE HEAT BALANCE TEST No. 2

- FLOW-LB/HR - PRESSURE-PSIA - ENTHALPY-BTU/LB - TEMPERATURE-F DEGREES

843805.

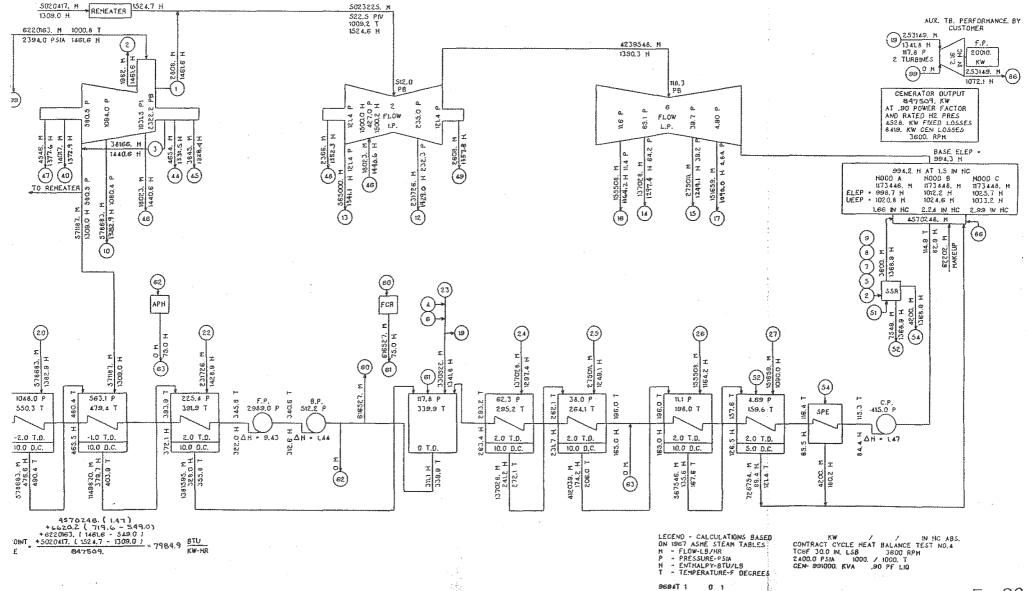


P14\_005060

### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

### CALCULATED DATA - NOT CUARANTEED

RATING FLOW IS 5974568. H. AT INLET STEAH CONDITIONS OF 2412.2 PSIA AND 1000.0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH HAY AFFECT THE, FLOW. THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW WRATING FLOW PLUS 5.0 PERCENT) OF 6272286, M THE COUNTALENT DESIGN FLOW AT 2394.0 PSIA AND 1000.8 T IS 822030. M THE VALUE OF CENTRATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



CONTRACT CYCLE HEAT BALANCE TEST No. 4

VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS ARTER ALL POWER FOR AND OTHER TURBINE-CEMERATOR AUXILIARIES HAS BEEN DEDUCTED.

THE I

No.s

CONTRACT CYCLE HEAT BALANCE TEST

% 3C, 90

7

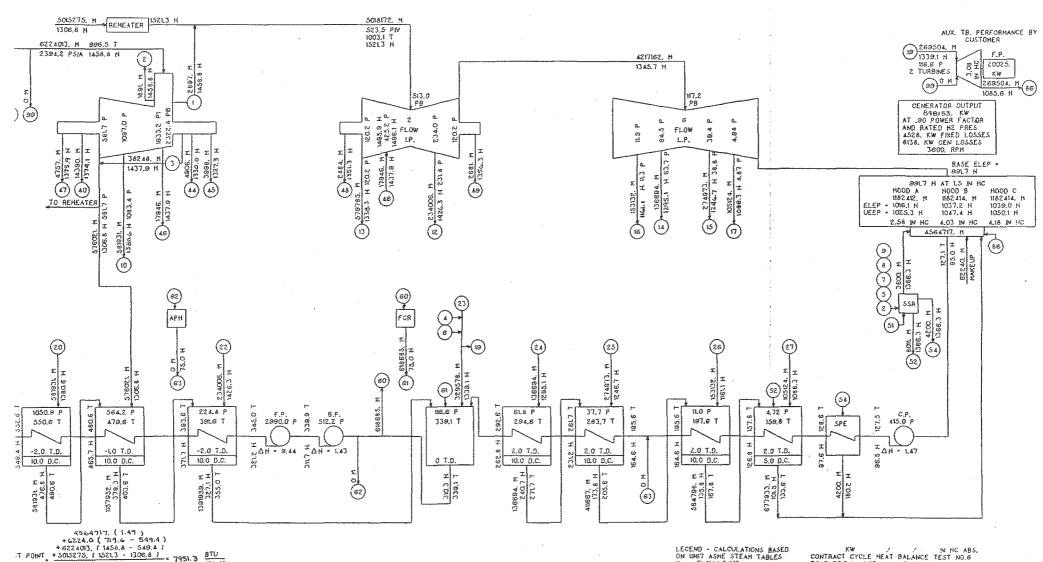
TURBINE AND EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

IP14\_005062

### TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

### CALCULATED DATA - NOT CUARANTEED

RATING FLOW IS 5963946. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSUME THAT THE TURBUME WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES. SHOP TOLERANCES ON DRAWING AREAS. ETC. WHICH MAY AFFECT THE FLOW. THE
TURBUME IS BEING DESICNED FOR A DESIGN FLOW IRATING FLOW PLUS S.O PERCENT) DF 8262143. H
THE EQUIVALENT DESIGN FLOW AT 2394.2 PSIA AND 996.5 T IS 623999. H
THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



CONTRACT CYCLE HEAT BALANCE TEST No. 6

H - FLOW-LB/HR P - PRESSURE-PSIA

- ENTHALPY-BTU/LB - TEMPERATURE-F DECREES

CONTRACT CYCLE HEAT BALANCE TEST NO.6 TCSF 30.0 IN. LSB 3800 R 2400.0 PSIA 1000. / 1000. T CEN-991000, KVA 90 PF LIO 3600 APH

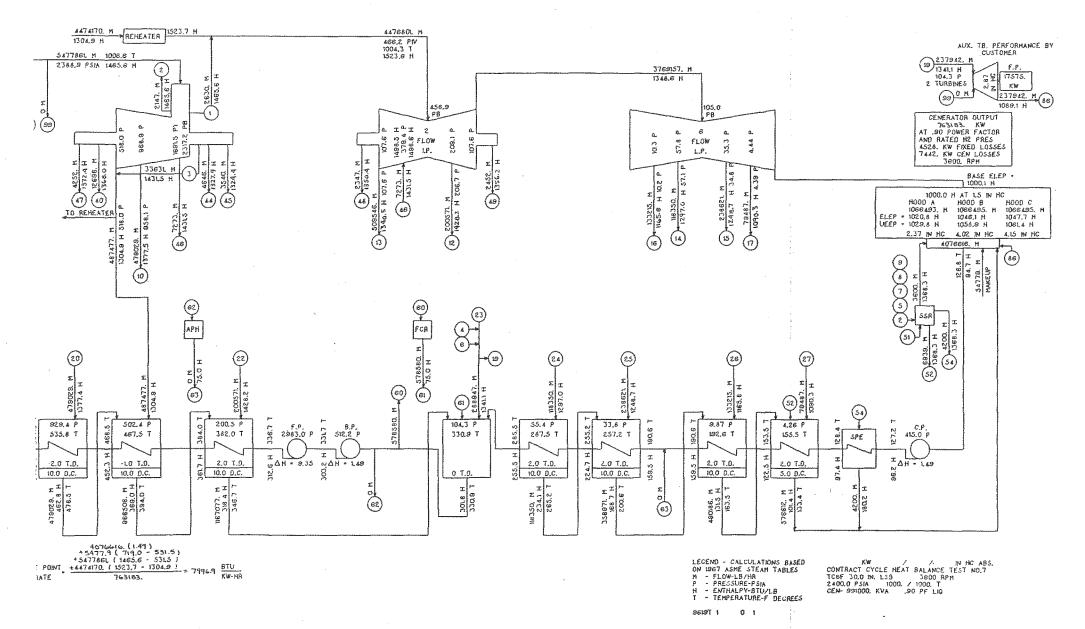
9613T 1 0 1

F16. 9E 5/14/87

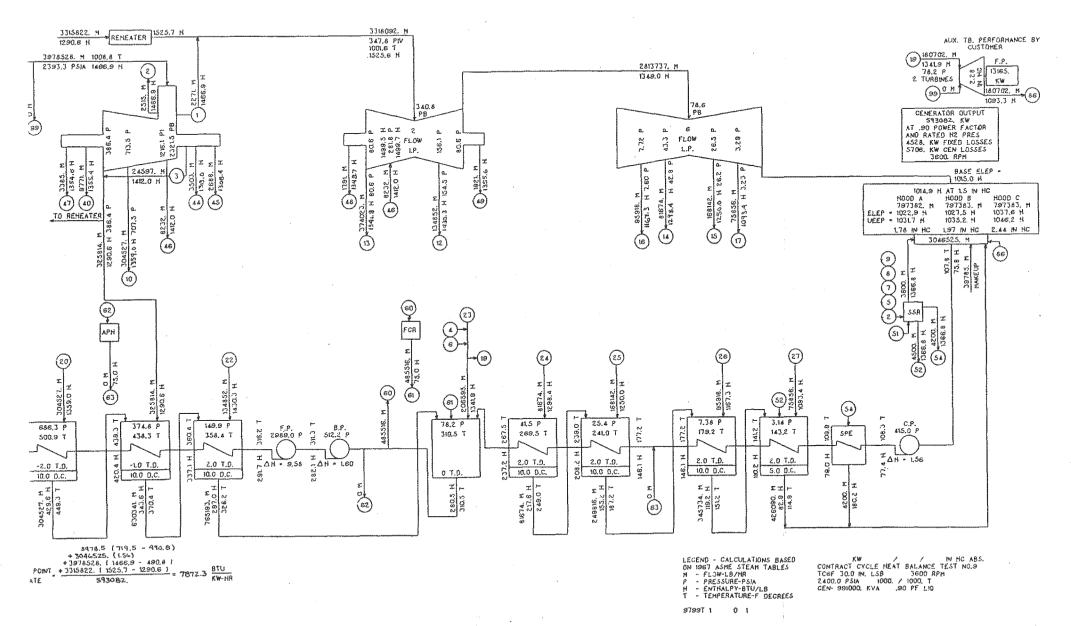
848153.

RATE

THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.

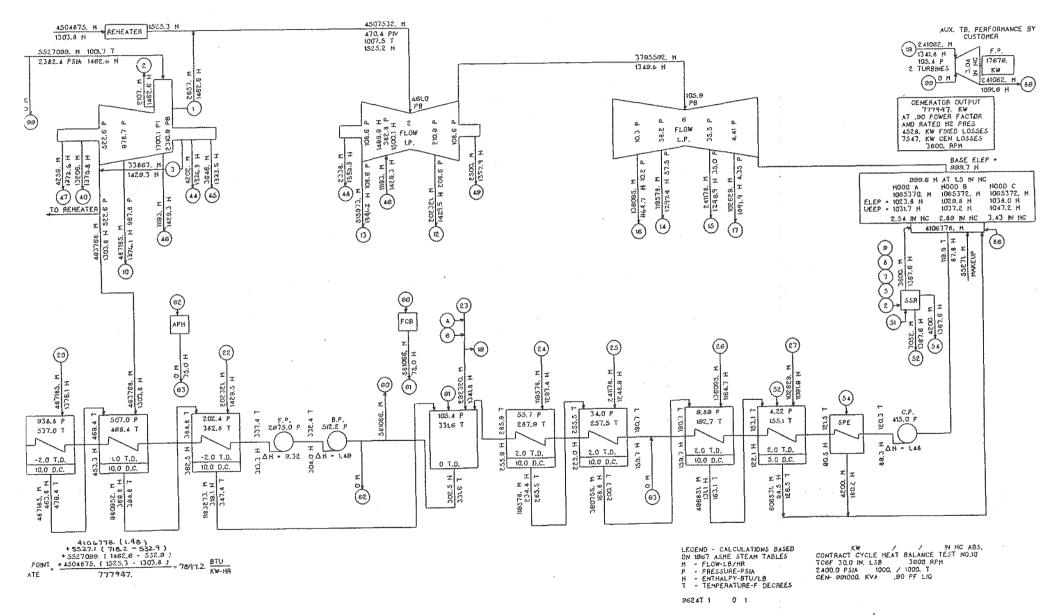


P14\_005064



IP14\_005065

THE VALUE OF CEMERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBUNE-CEMERATOR AUXILIARIES HAS BEEN DEDUCTED.



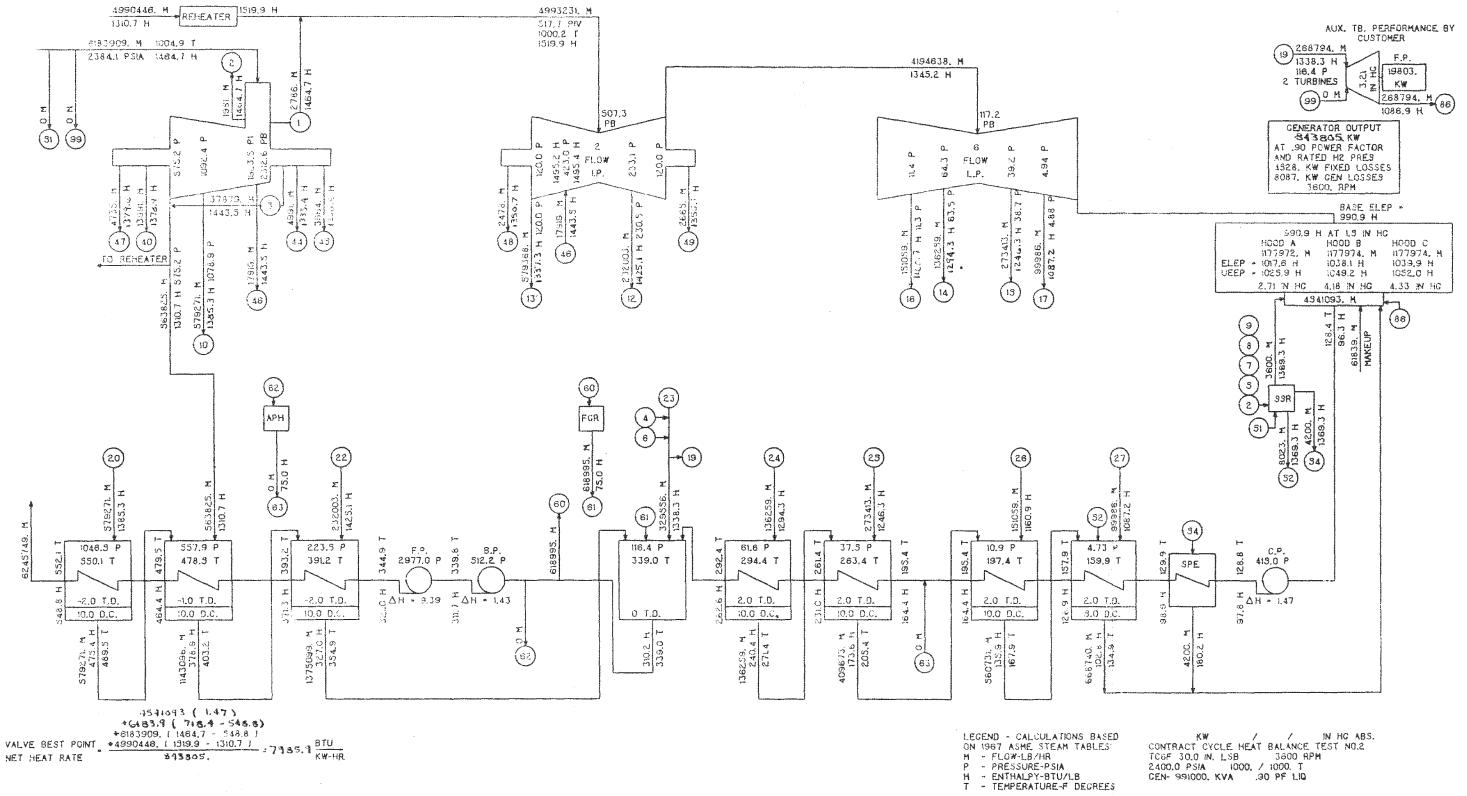
IP14\_005066

## CALCULATED DATA - NOT GUARANTEED

RATING FLOW IS 5979059. M AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES. SHOP TOLERANCES ON DRAWING AREAS. ETC. WHICH MAY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW WRATING FLOW PLUS S.O PERCENTI OF 8278012, M
THE EQUIVALENT DESIGN FLOW AT 2384.1 PSIA AND 1004.9 T IS 6183895. M
THE VALUE OF CENERATOR DUTPUT SHOWN ON THIS HEAT BALLANCE IS AFTER ALL POWER FOR

EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.

99487 1 0 1

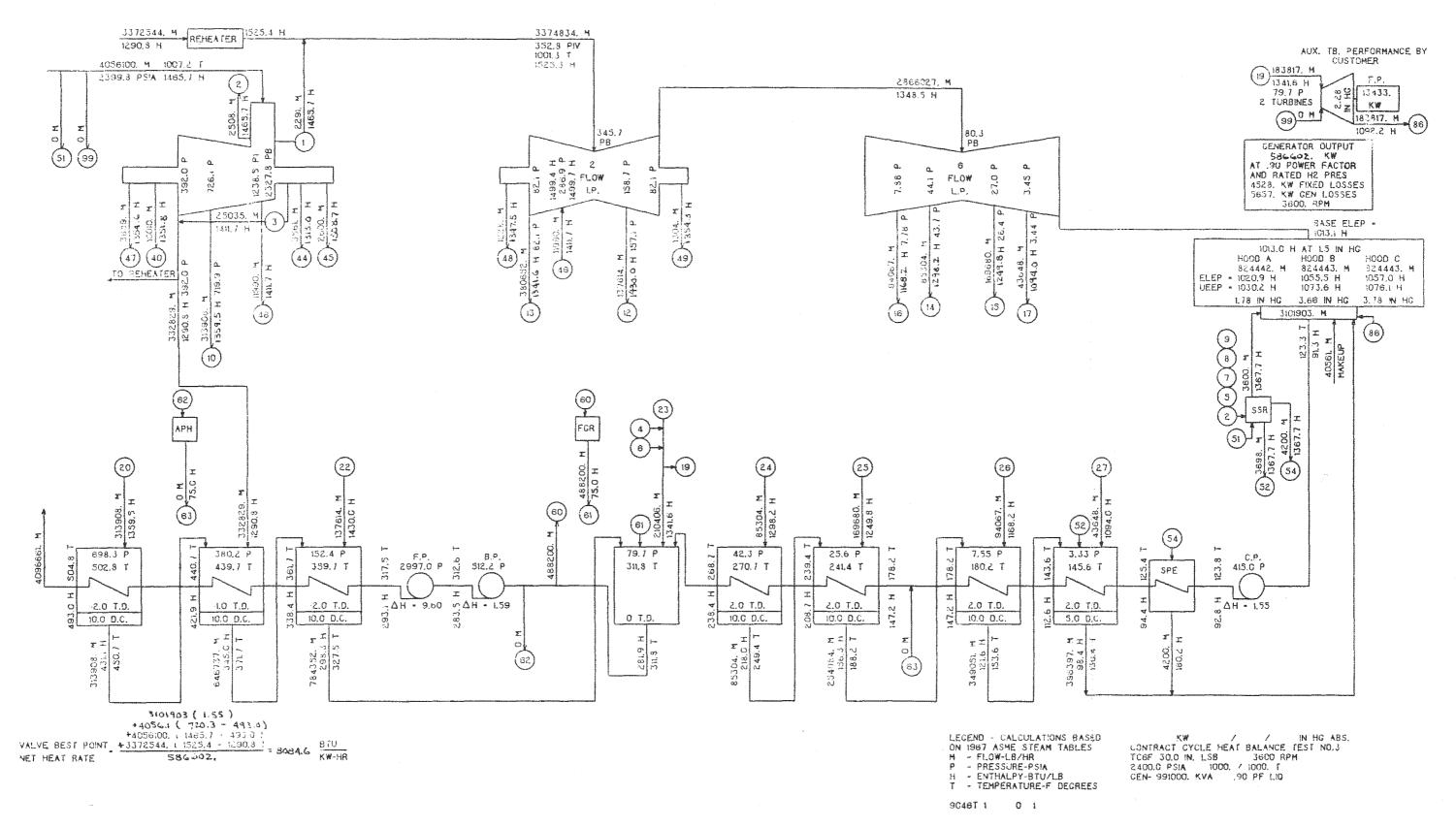


CONTRACT CYCLE HEAT BALANCE TEST No. 2

GENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

F19. 9A 5/14/87

THE VALUE OF CENERATOR DUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



UENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

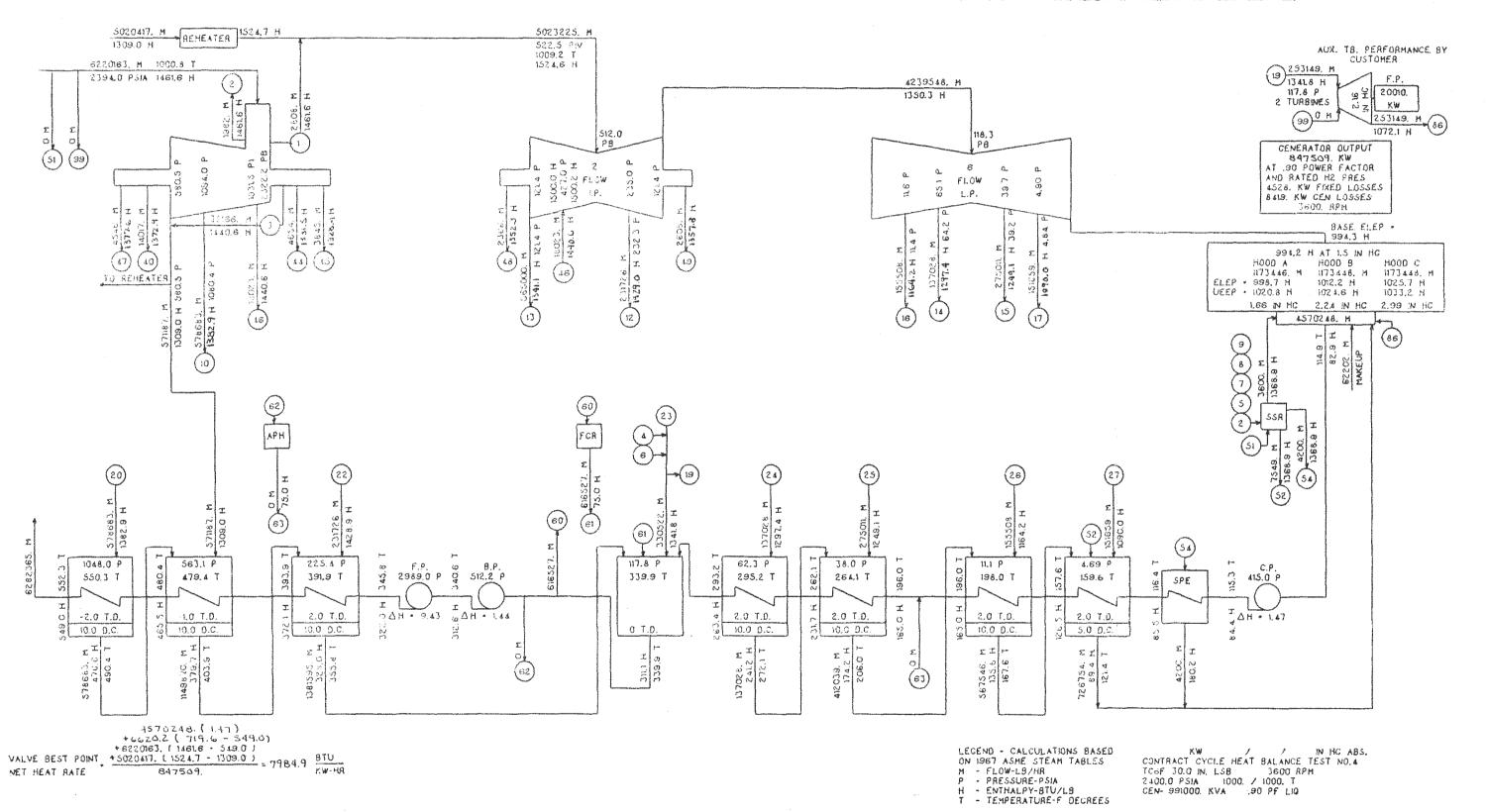
5/14/87 F16. 9B

# CALCULATED DATA - NOT CUARANTEED

RATING FLOW IS \$974568. H. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T.
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW, THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS S.O PERCENT) OF 6273296. H
THE EQUIVALENT DESIGN FLOW AT 2394.0 PSIA AND 1000.8 T IS 6220150. H
THE VALUE OF CENERATOR DUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR

EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED,

9694T 1 0 1

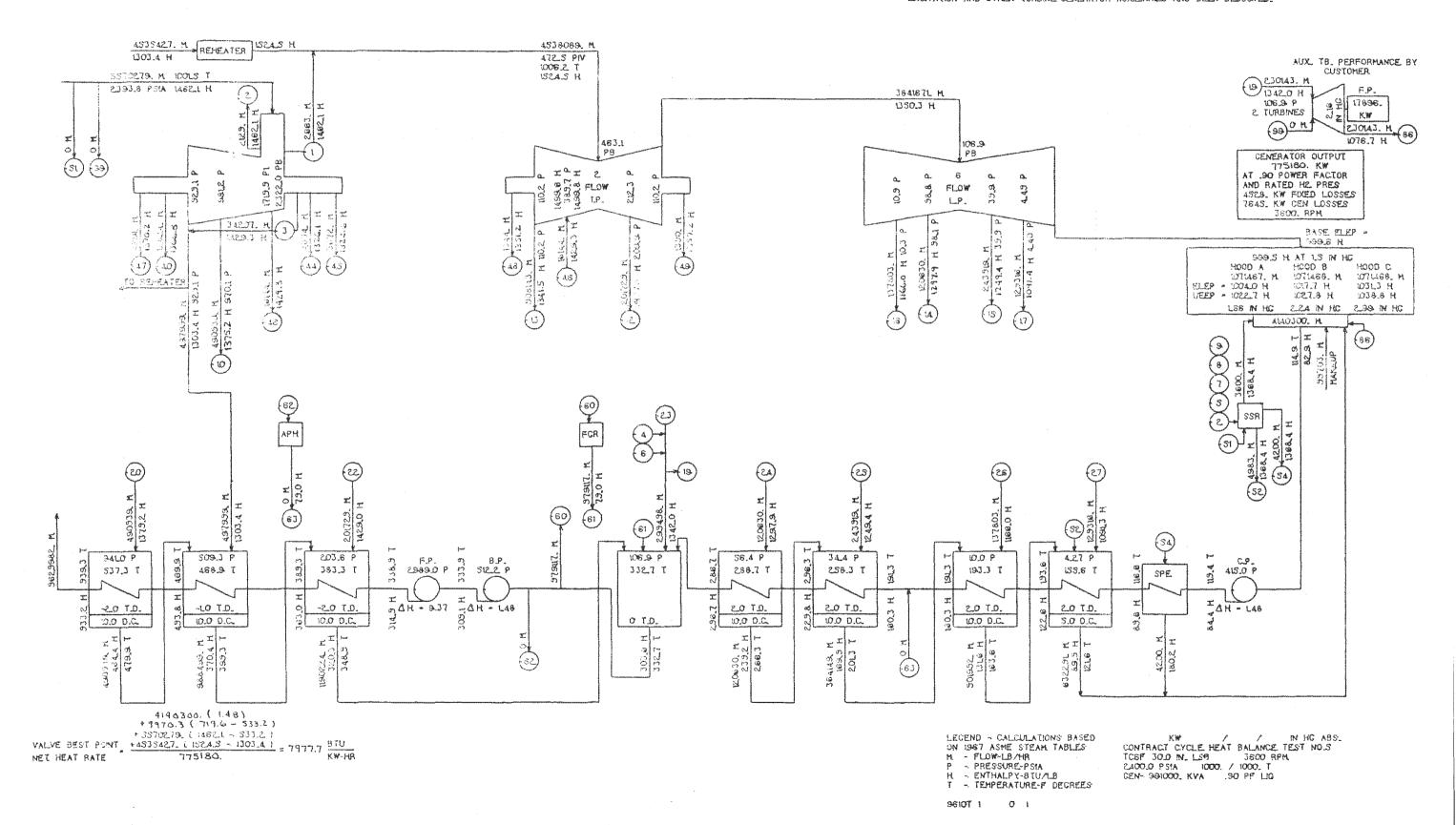


CONTRACT CYCLE HEAT BALANCE TEST No.4

CENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

F16. 9C 5/14/87

THE VALUE OF CENERATOR DUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



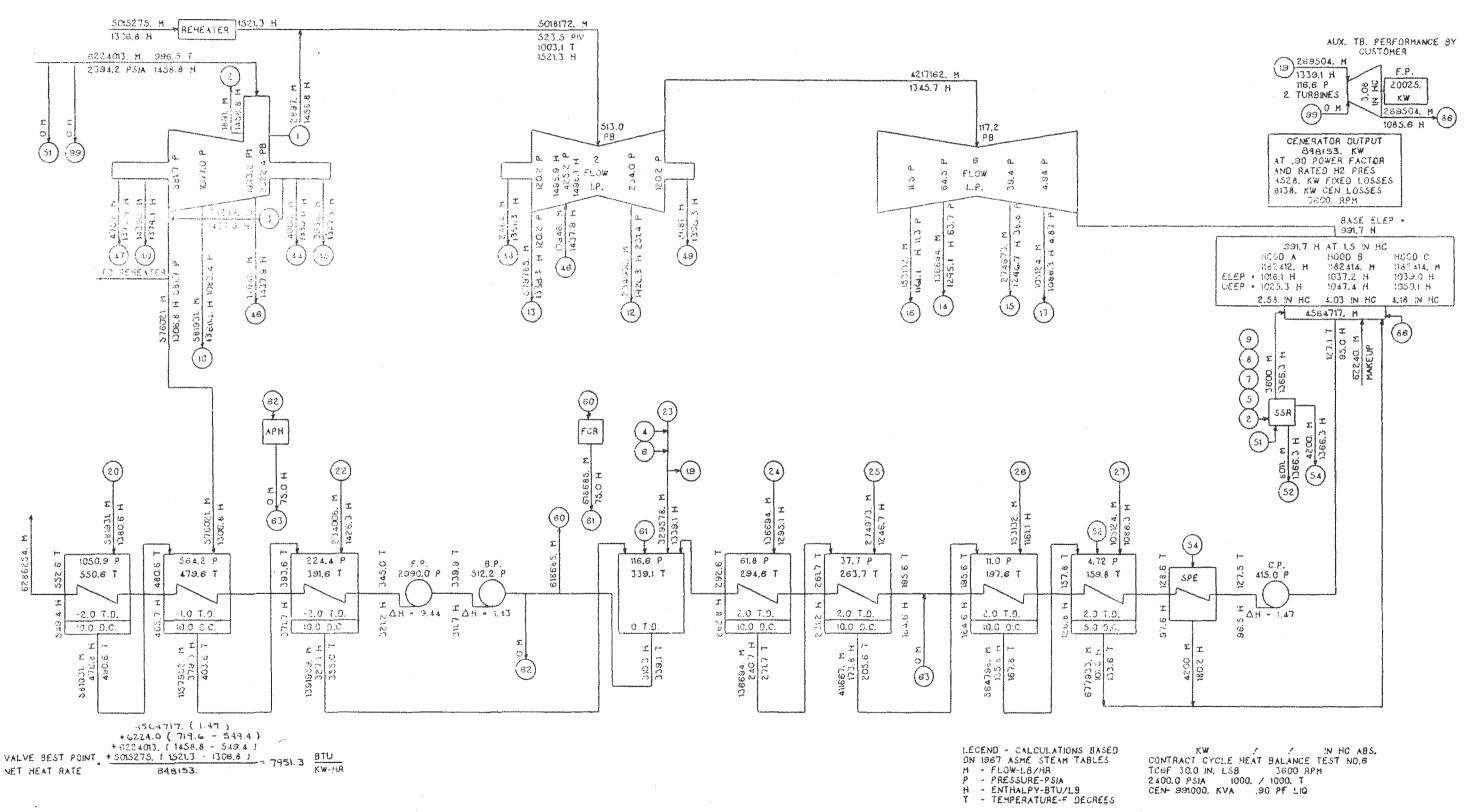
CENERAL ELECTRIC COMPANY\_ SCHENECTADY N.Y.

9/14/87 FIG. 9D

# CALCULATED DATA - NOT GUARANTEED

RATING FLOW IS 5963946, M. AT INLET STEAM CONDITIONS OF 2412.2 PSIA AND 1000.0 T
TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW. CONSIDERING VARIATIONS IN FLOW COEFFICIENTS
FROM EXPECTED VALUES. SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW. THE
TURBINE IS BEING DESIGNED FOR A DESIGN FLOW IRATING FLOW PLUS S.O PERCENT) OF 6262143. M
THE EQUIVALENT DESIGN FLOW AT 2394.2 PSIA AND 996.5 T IS 6223999. M
THE VALUE OF JENERATOR DUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR
EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.

96137 1 0 1



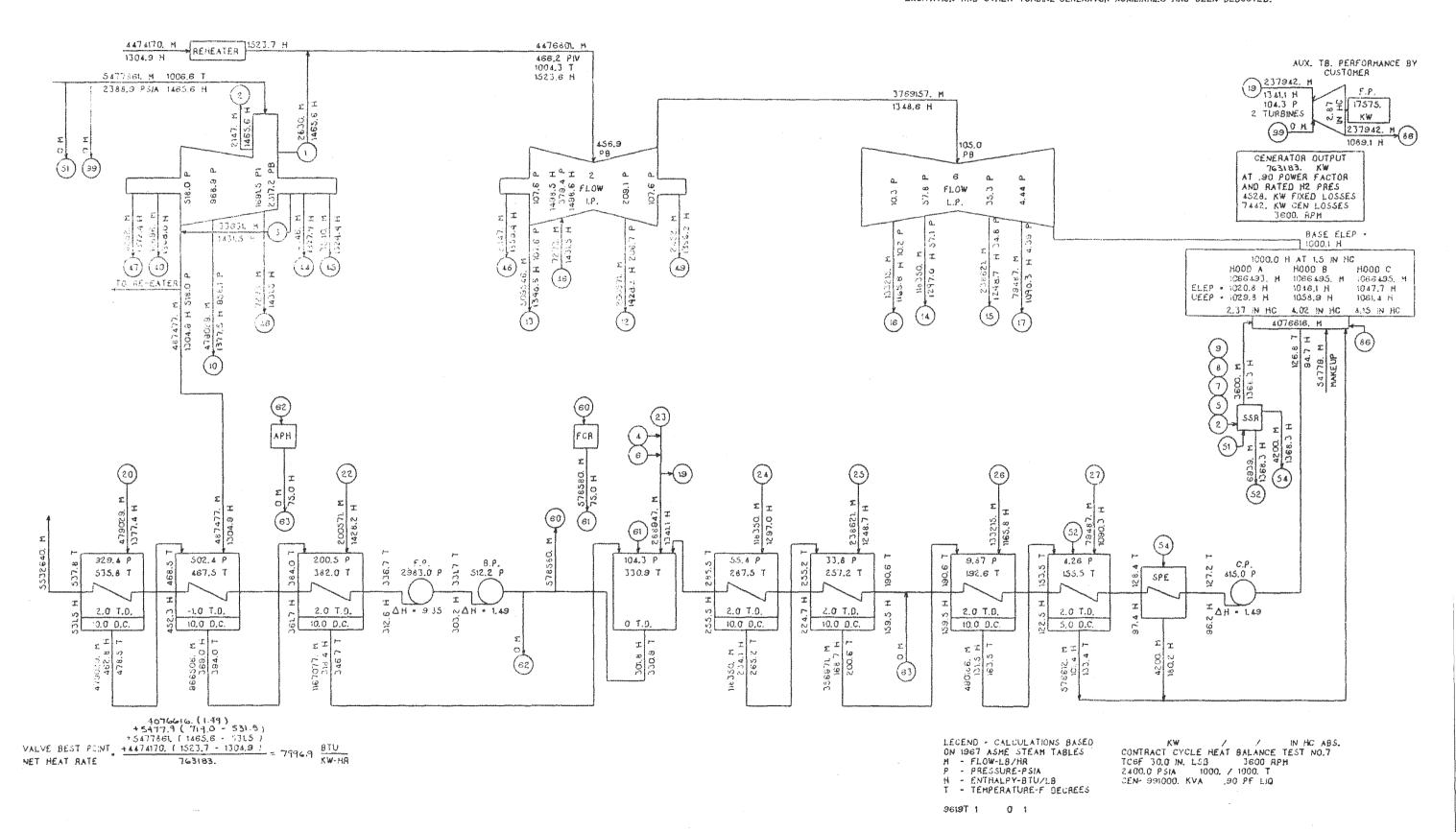
CONTRACT CYCLE HEAT BALANCE TEST No. 6

CENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

F14.9E

5/14/87

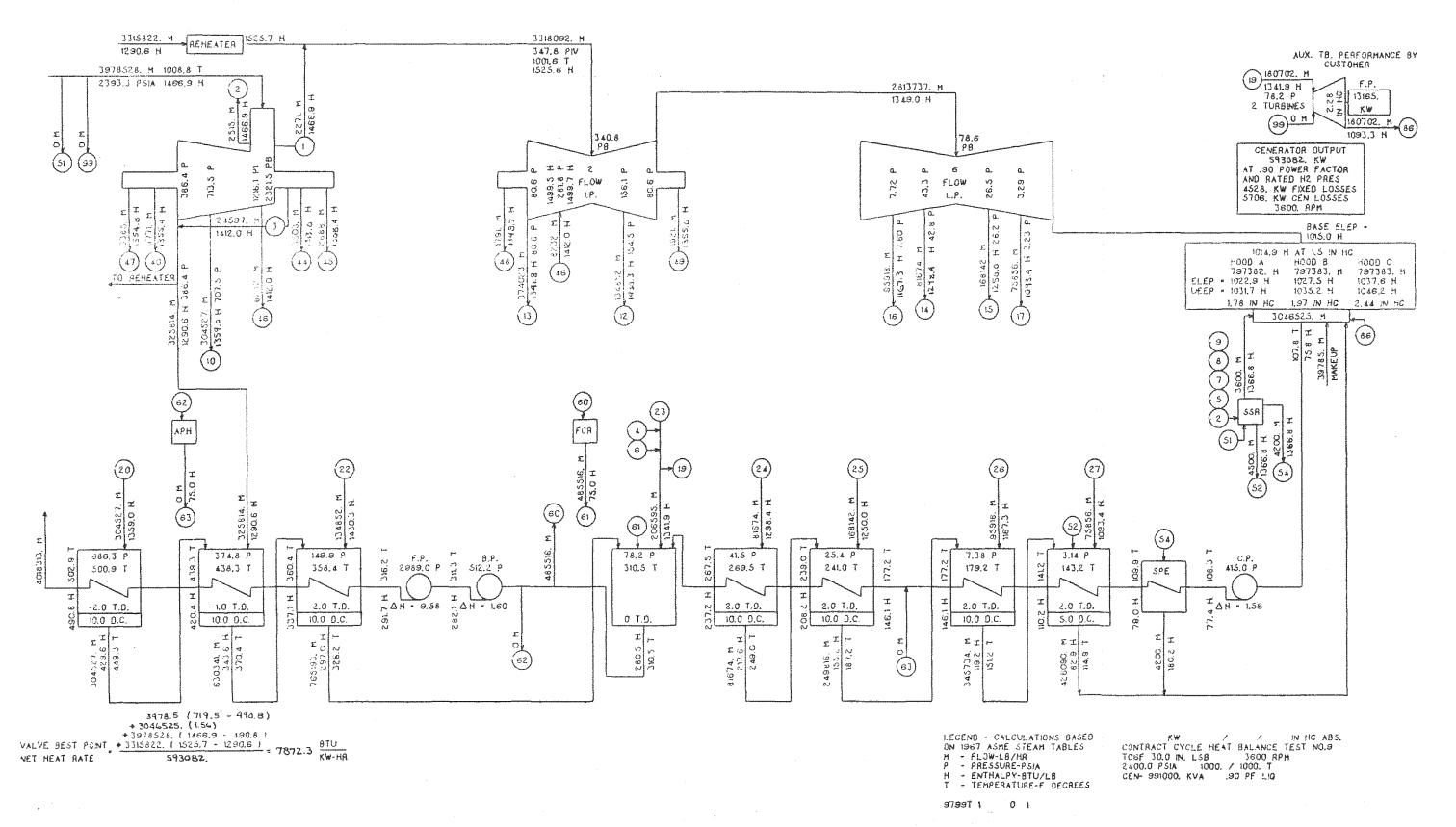
THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED.



GENERAL ELECTRIC COMPANY, SCHENECTABY N.Y.

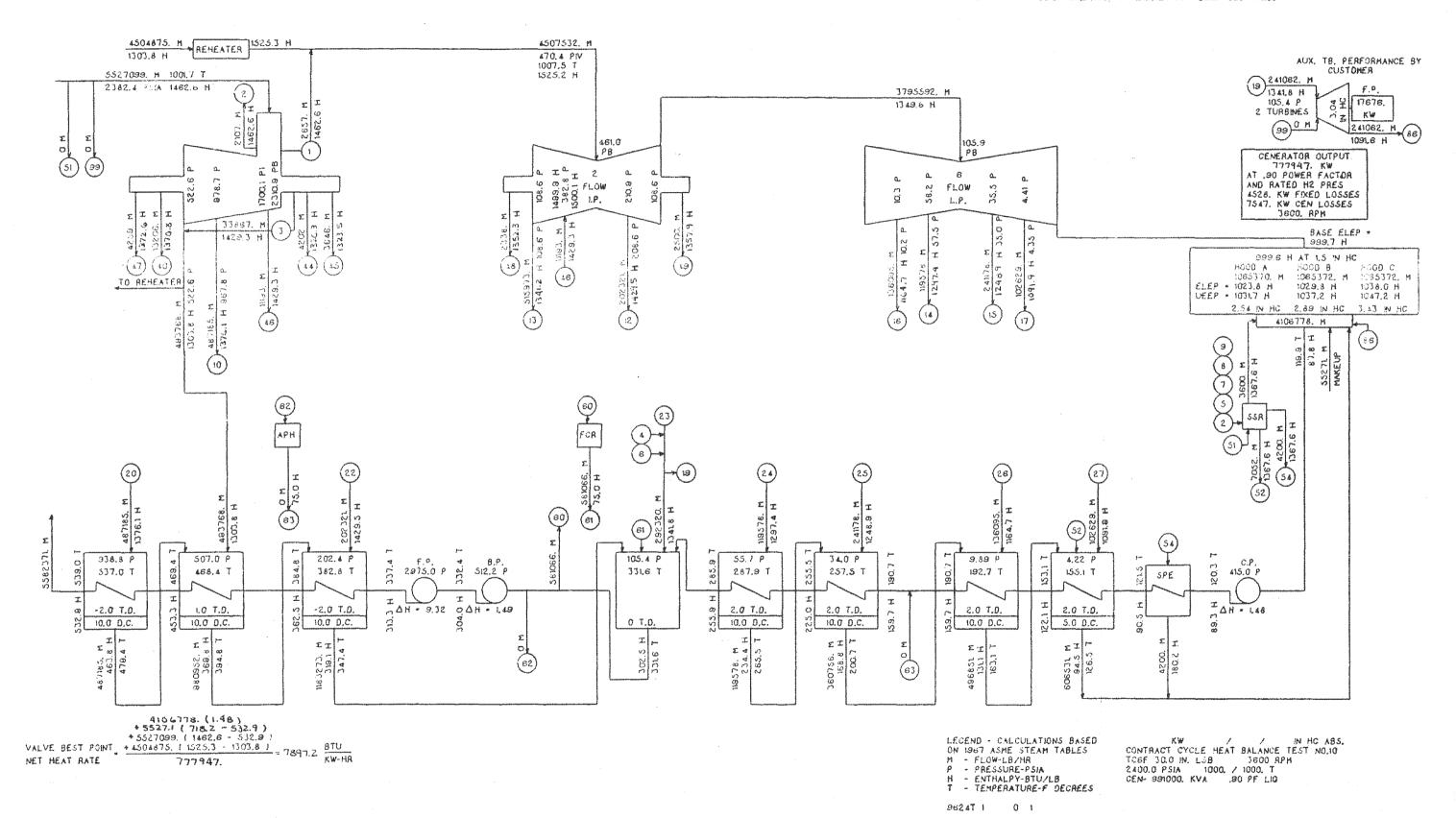
5/14/87 FIG. 9F

THE VALUE OF CENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-CENERATOR AUXILIARIES HAS BEEN DEDUCTED.



GENERAL ELECTRIC COMPANY, SCHENECTABY N.Y.

5/14/87 FIG. 96



CENERAL ELECTRIC COMPANY, SCHENECTADY N.Y.

5/14/87 FIG. 9H

# INTERMOUNTAIN POWER CO.

Unit No. 2 T 151

# High Pressure Section Efficiency

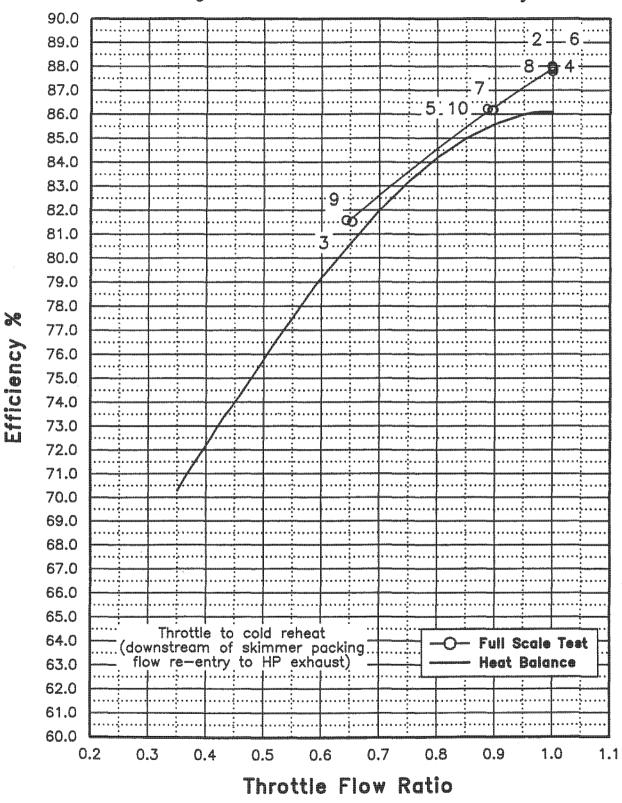
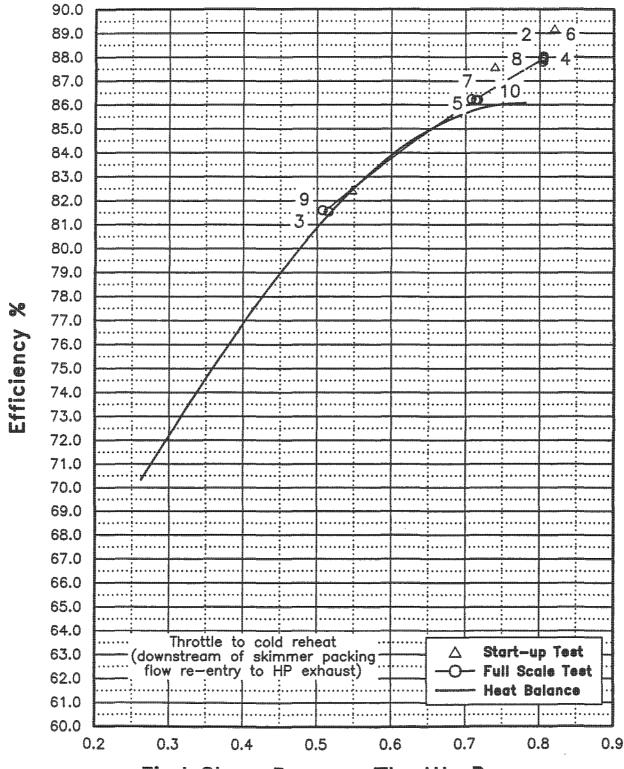


Figure 10

# INTERMOUNTAIN POWER CO.

Unit No. 2 T 151

# High Pressure Section Efficiency



First Stage Pressure/Throttle Pressure

Figure 11

Lat No. 2 4 151

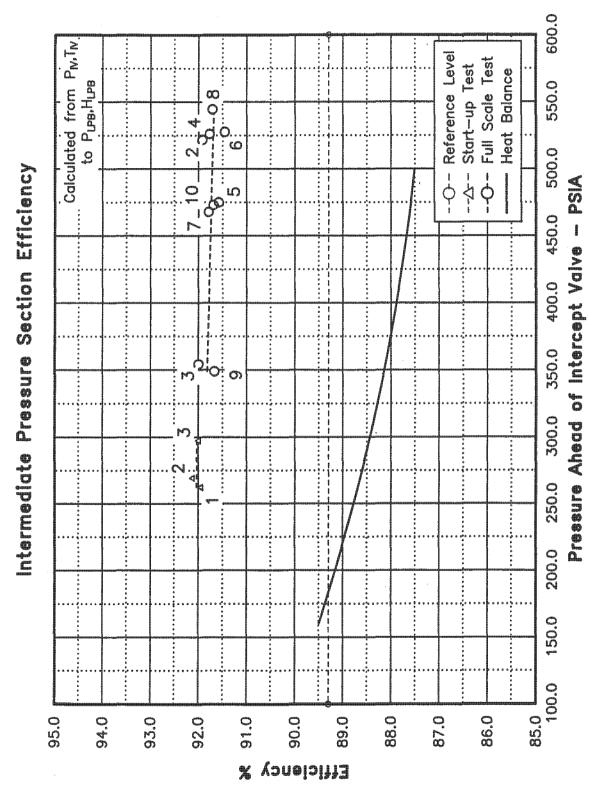


Fig. 12

PP No. 2

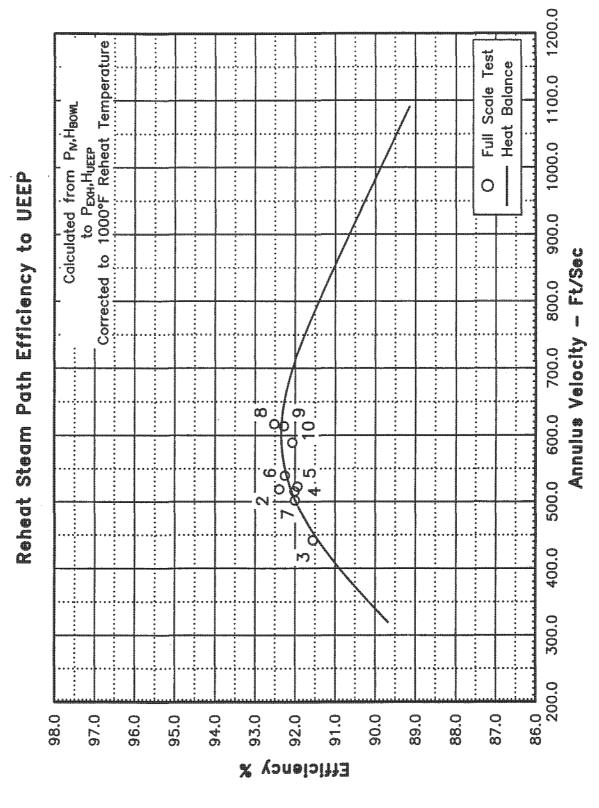
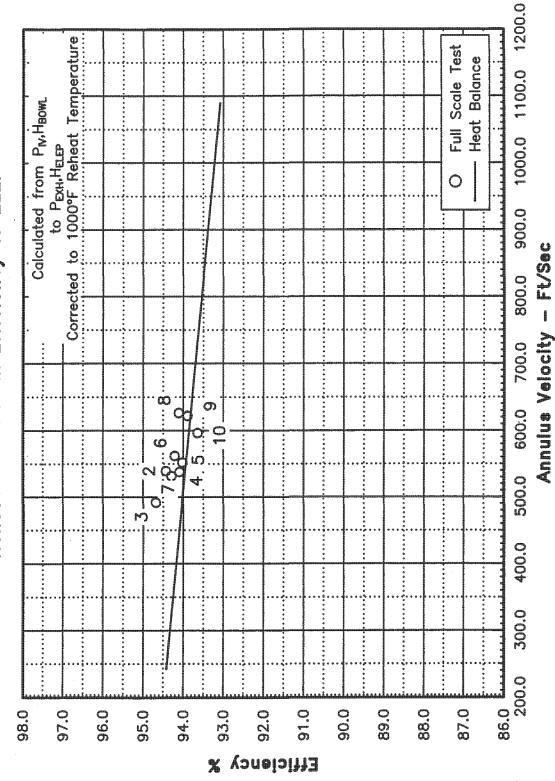


Fig. 13

PP No. 2

Reheat Steam Path Efficiency to ELEP



F16. 14

Unit No. 2 T 151



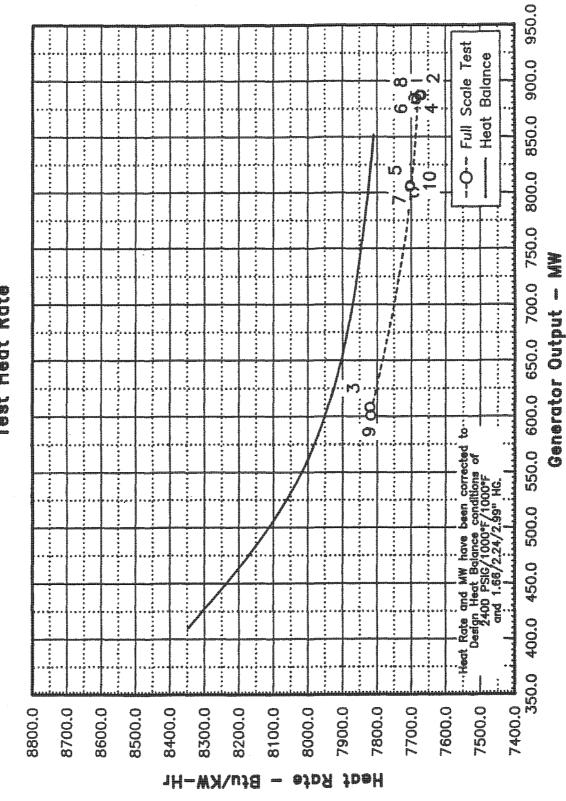


Fig. 15

INTERMOUNTAIN POWER CO.

Unit No. 2 T 151



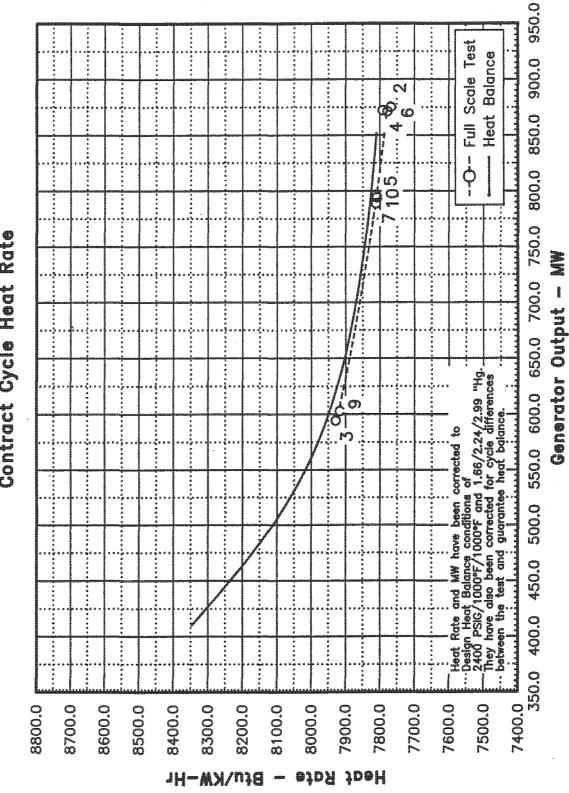
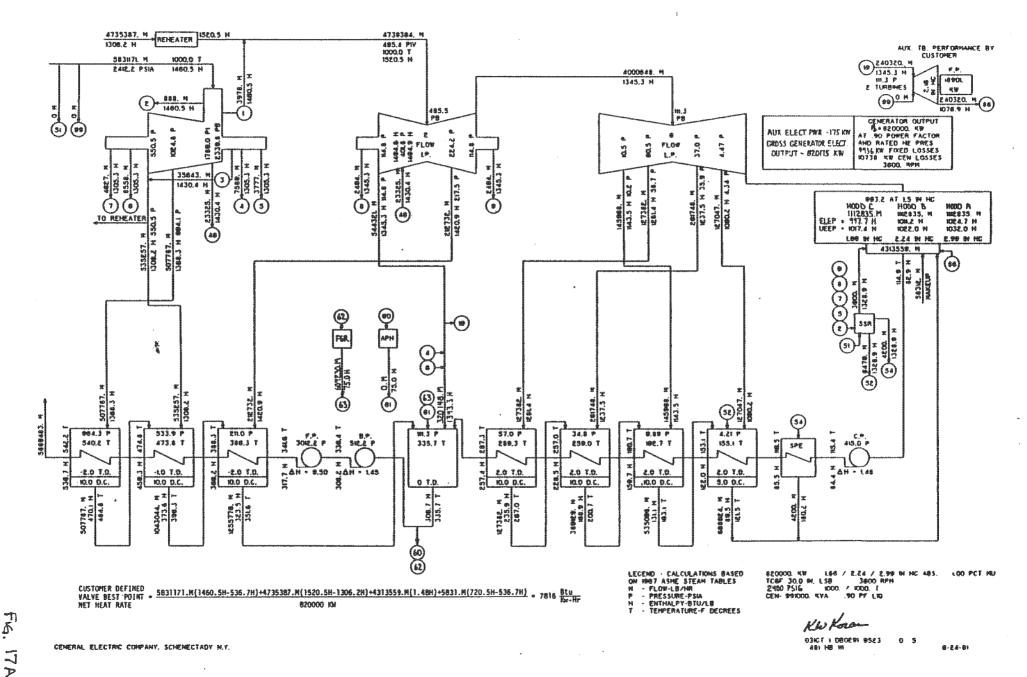


Fig. 16



### EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

### CALCULATED DATA - NOT CHARANTEED

RATHIC FLOW IS 583HT, 4. AT PRET STEAM COMPTIONS OF 2482 E PSVA AND 100GG T TO ASSURE THAT THE TURBING WELL PASS THAS FLOW. CONSIDERING VARIATIONS AN PLOW COEFFICIENTS FROM EXPECTED PALLES, SHOP TOILERANCES ON DOARDIG AREAS, ETC WHICH HAY AFFECT THE FLOW, THE TURBING IS BEING DESCRIED FOR A DESCRIPTION PLOW PRATING FLOW PLUS S,G PERCENTY OF BUZZTOG, 4

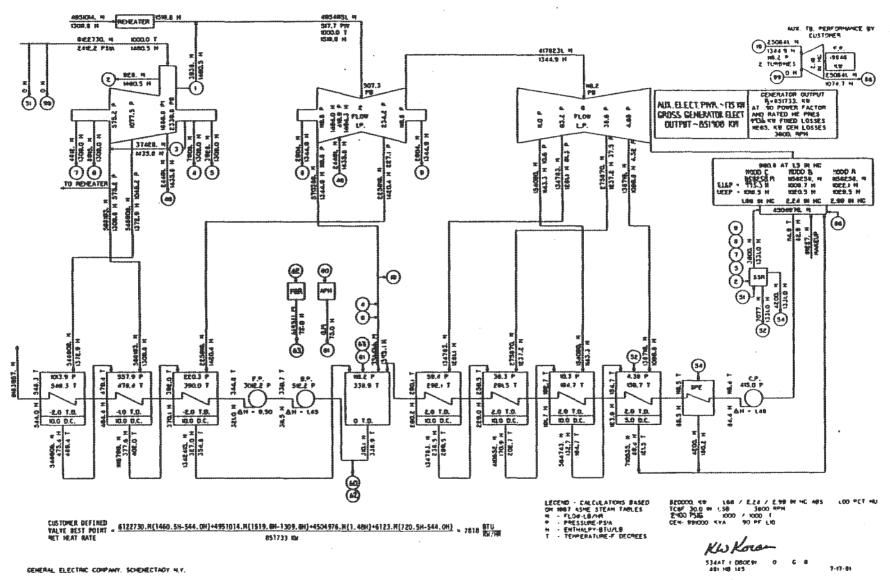


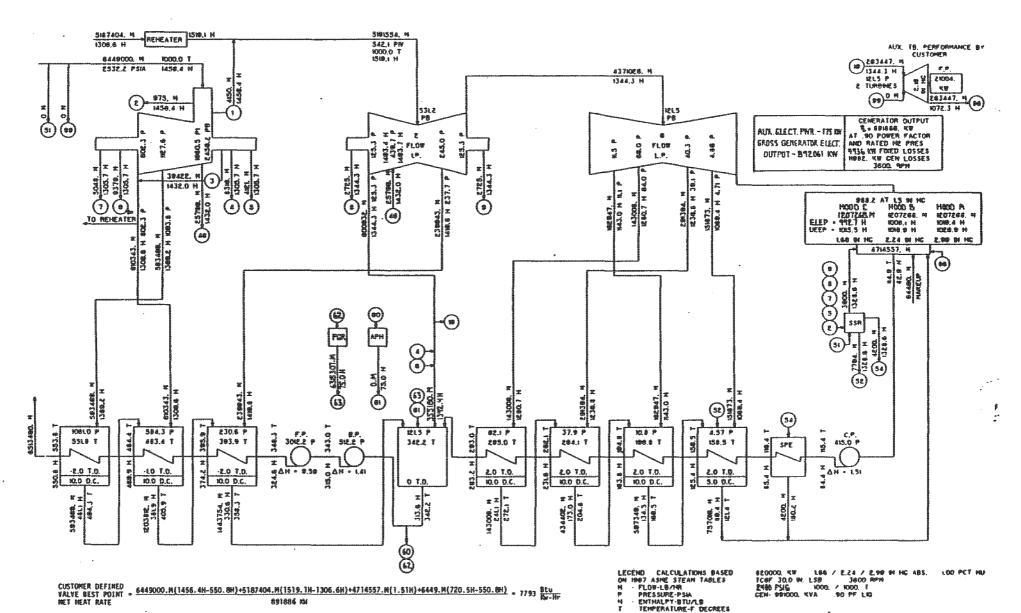
Fig. 17B

Fig. 178

### EXTRACTION ARRANCEMENT IS SCHEMATIC ONLY

### CALCULATED DATA NOT CUARANTEED

RATING FLOW IS 583HTLM. AT BILET STEAM CONDITIONS OF ZAIR2 PSIA AND 1000 OT TO STAND THE TURBING WILL PASS THIS FLOW. CONSIDERANC MARRATIONS OF FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRABING AREAS, ETC. WHICH MAY AFFECT THE FLOW. THE TURBRE IS BEING DESIGNED FOR A DESIGN FLOW HATTMC FLOW PLUS 3.0 PERCENT! OF 6122730. M THE EQUIVALENT DESIGN FLOW AT 2532.2 PSIA AND 1000.0 T 15 8449000 M



Fi6. 7 G

Fig. 17C

03107 1 080281 481 100 mg

261 NS 146

Fig. 17D

2408263. 4 REHEATER 1527.7 H

10000.0 T

1460.5 H

17210. 4

1400.+ H

 $_{\odot}$ 

1480.5 H

2417895. 4

2412.2 PSIA

TO REHEATER

2.34 6.0 L.P.

2022237, M

1347.0 H

5.42 30.8 €FØ# AUX. TB PERFORMANCE BY CUSTOMER

10909

ベヤ 136620. 9

H00'D A 589415, M 1083,8 H 1087,1 H

19 156620. M 1347 0 M 56,4 P g TUMBMES

AUX ELECT PWR ~ 175 KM

GROSS GENERATOR ELECT

DUT PUT ~ 410175 KM

CONTROL ~ 175 KM

ELET - NOSI W UEEP - 1043.0 H

99

1030.3 AT 1.5 M HC 18 C. H00D B. 145.Ft Sanats, M Lt H 1048.5 M 3.0 M 1063.5 M

2H W 99.3 2H W 45.5 2H W 88.1 P J884155

£410675. H 253 4 PIV 1000.0 T 1527.5 H

1,200 1,200 1,200 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500 1,500

7.5

IP14\_005086

7 m Fig. 17E

481 MB 148

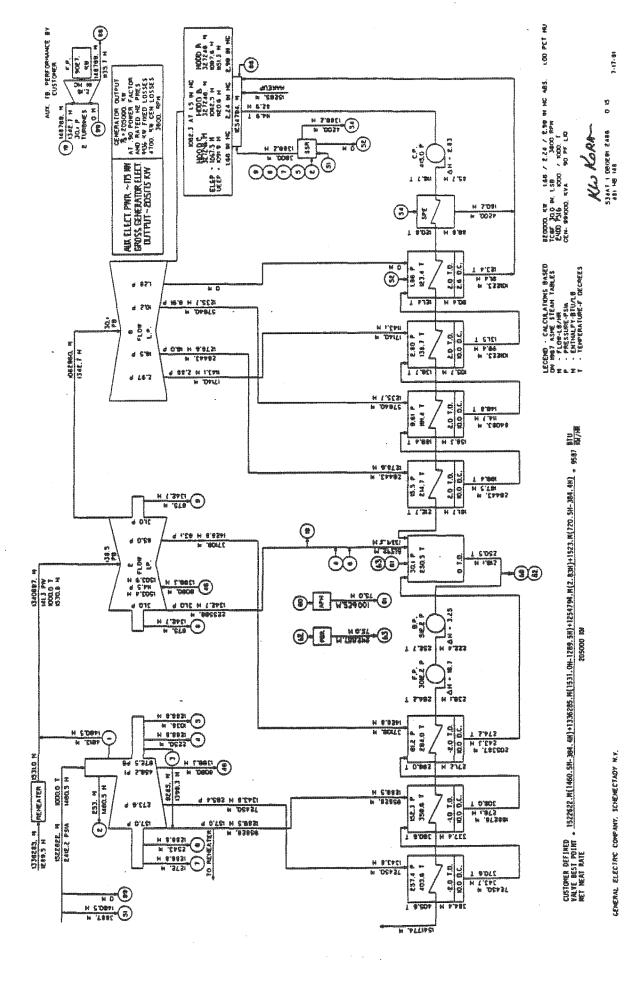
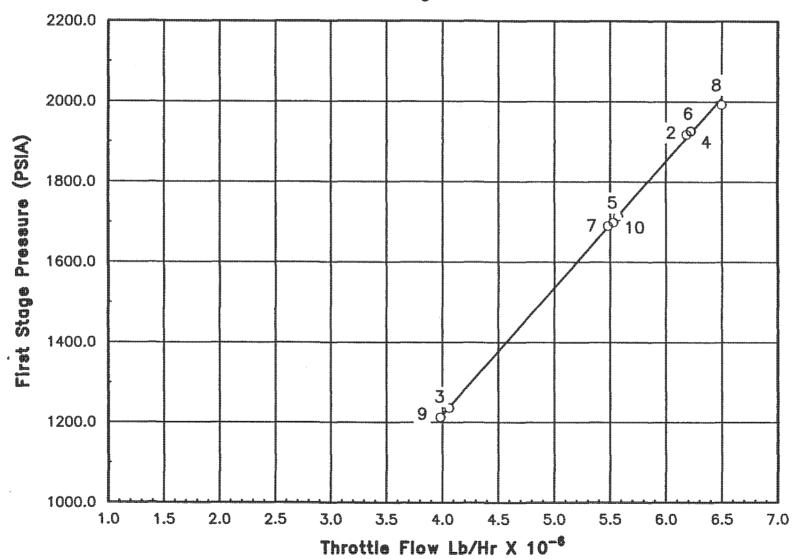


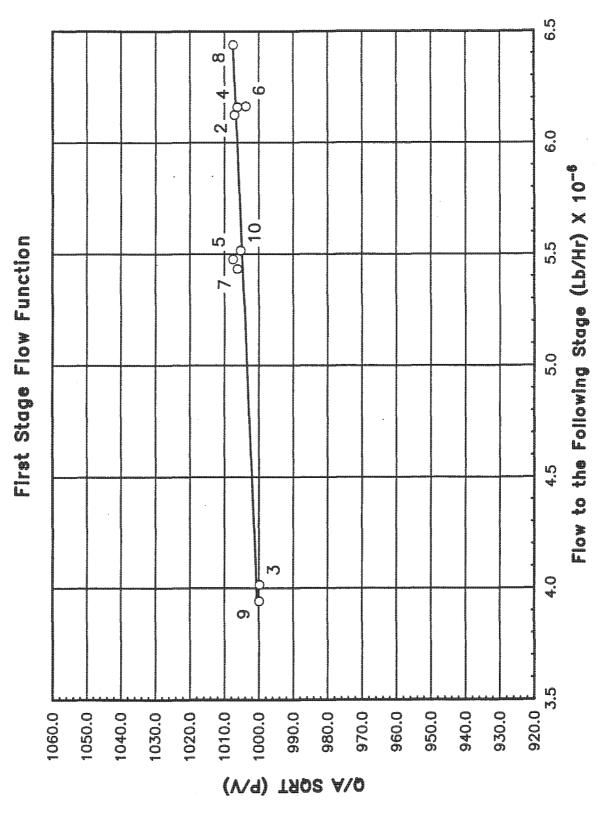
FIG. 17 F

Unit No. 2 T 151

1st Stage Pressure



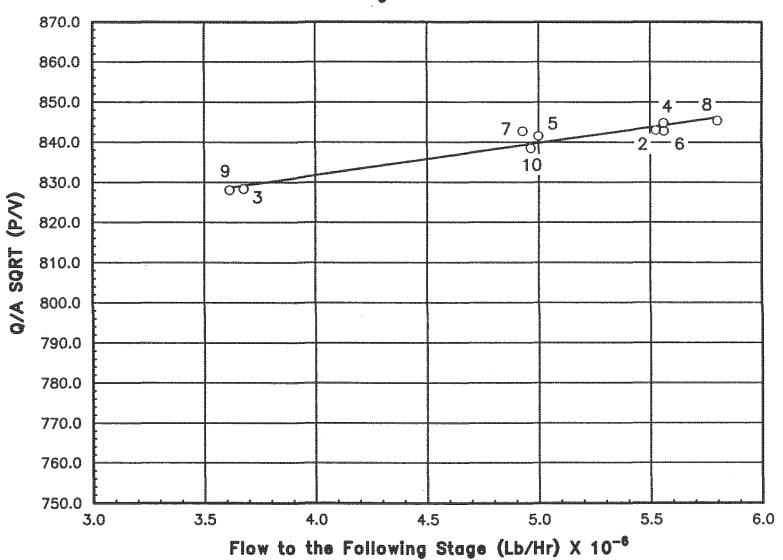
PP % 2



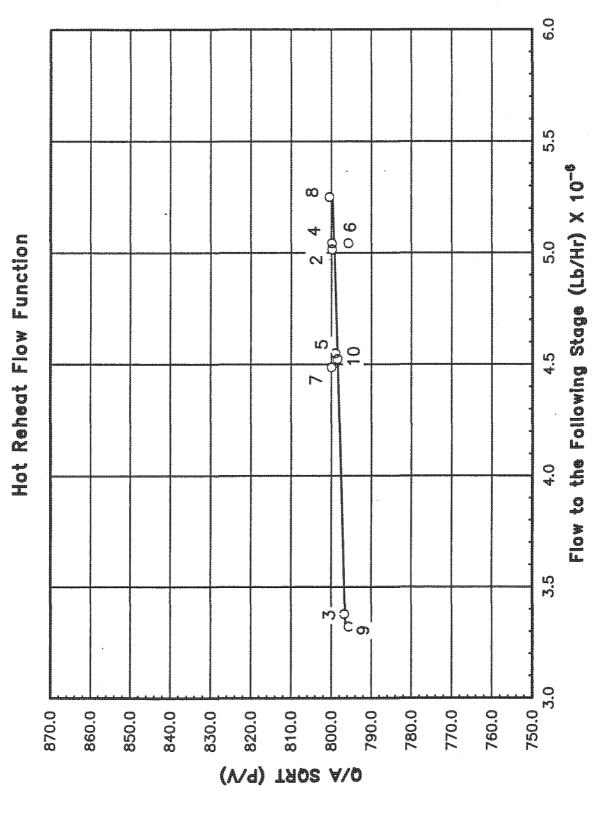
F16. 19

IPP No. 2

4th Stage Flow Function



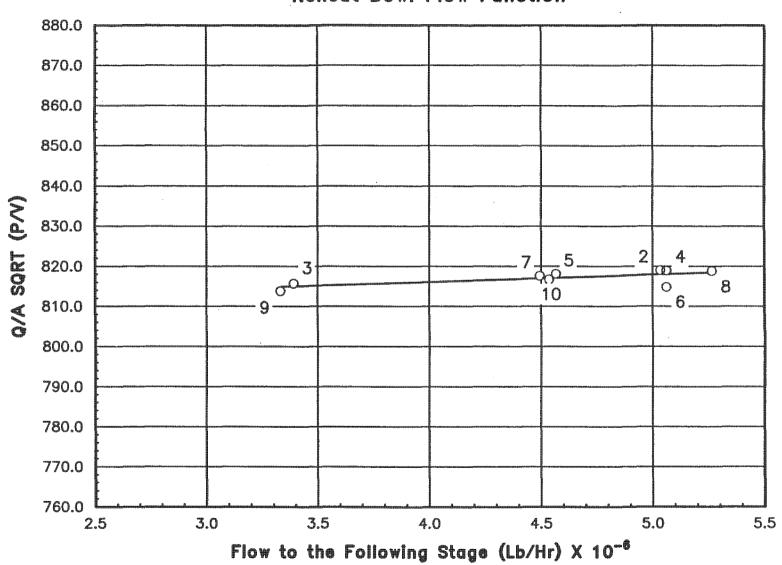
PP No. 2



F16. 21

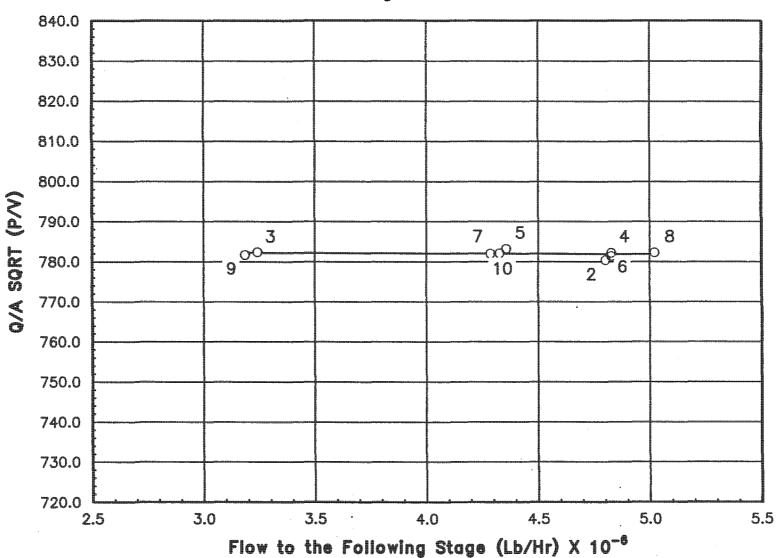
IPP No. 2

### Reheat Bowl Flow Function



IPP No. 2

11th Stage Flow Function



IPP No. 2

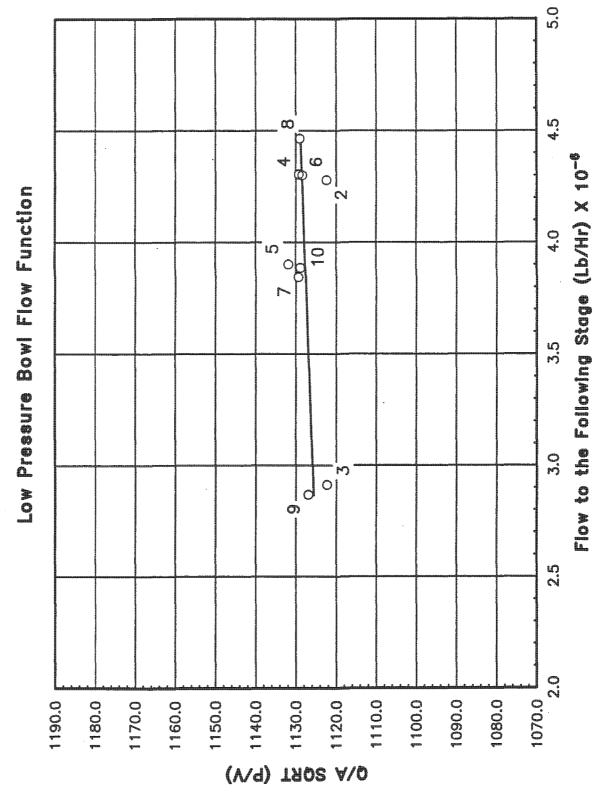
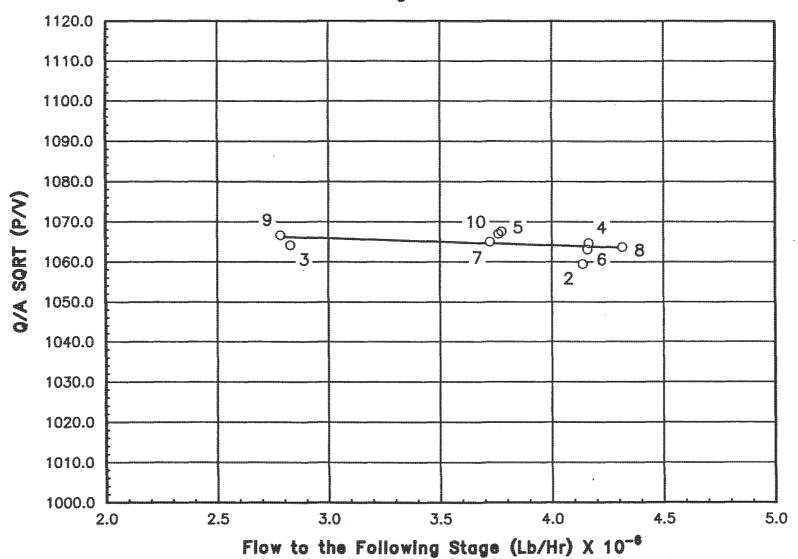
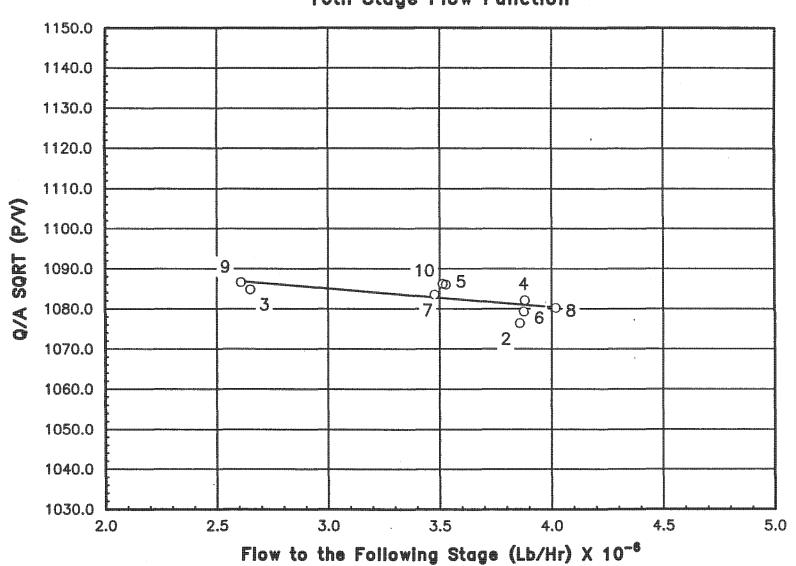


Fig. 24

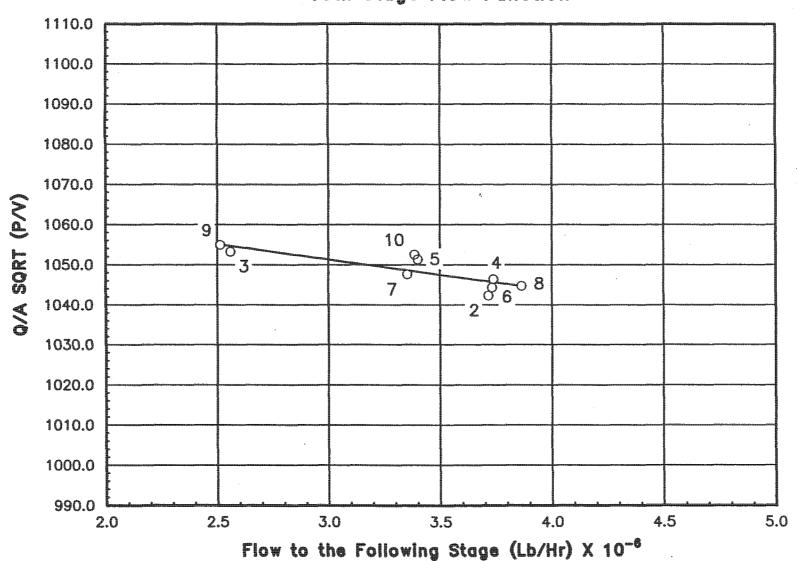
IPP No. 2 15th Stage Flow Function



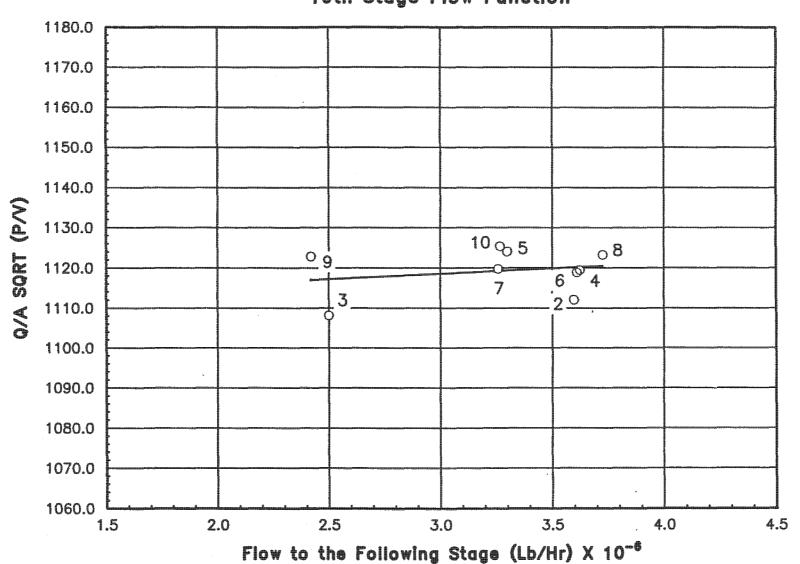
IPP No. 2 16th Stage Flow Function



IPP No. 2 18th Stage Flow Function

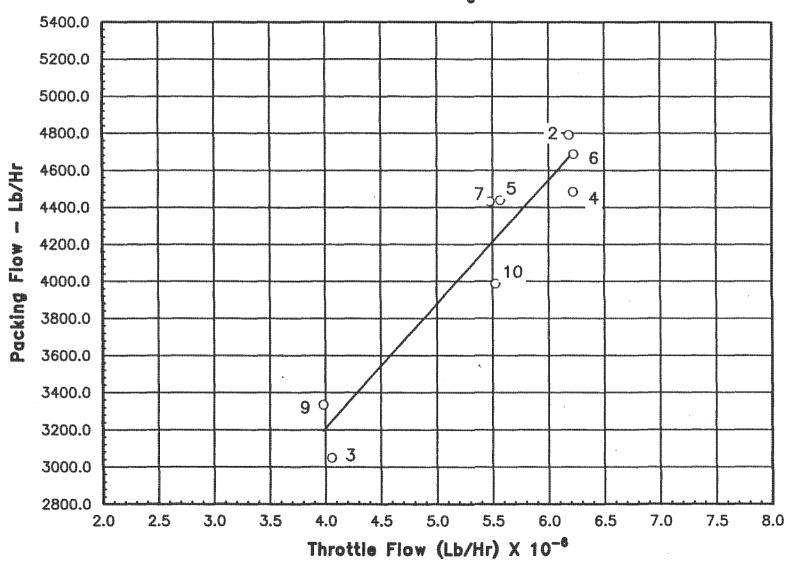


IPP No. 2 19th Stage Flow Function



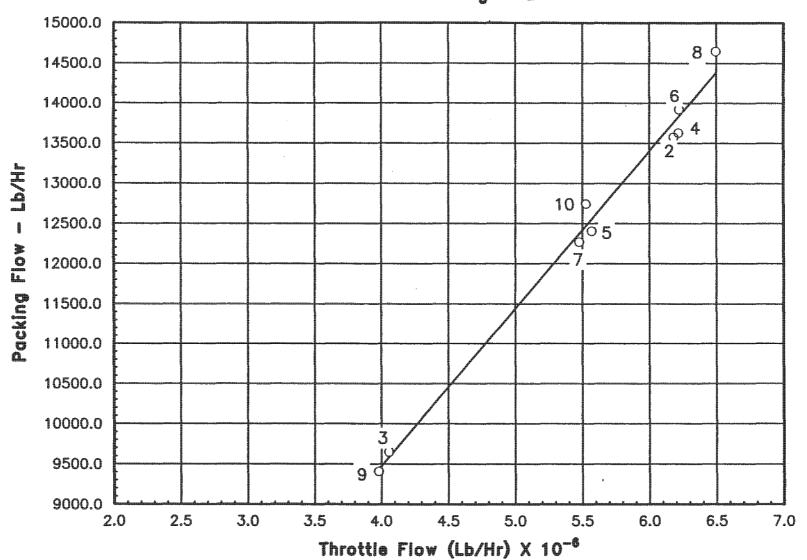
Unit No. 2 T 151

No. 1 Packing HPLO



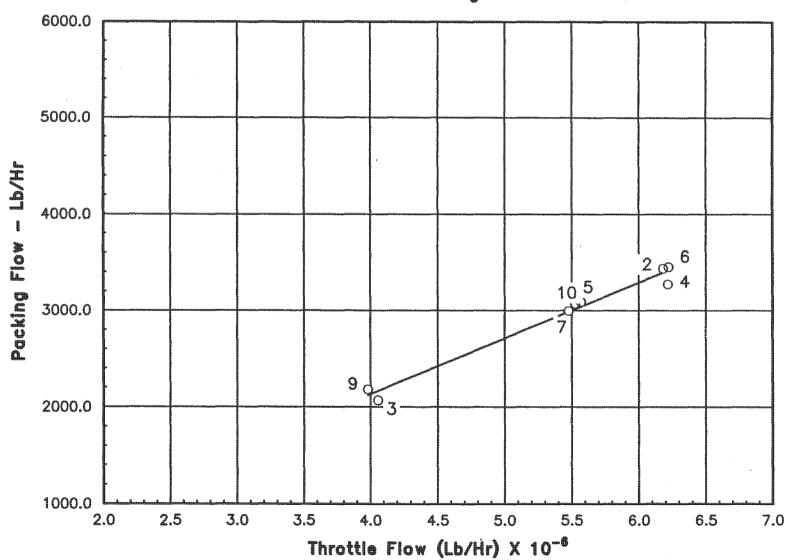
Unit No. 2 T 151

No. 2 Packing HPLO



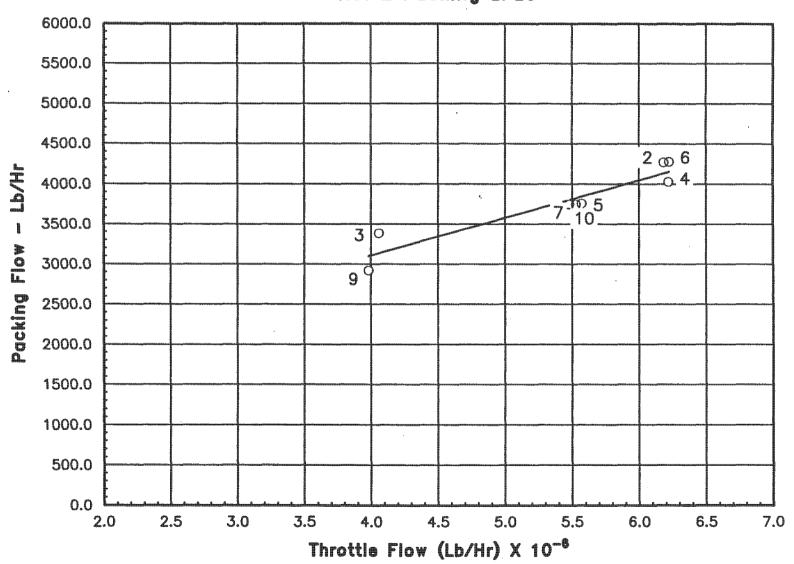
Unit No. 2 T 151

No. 1 Packing LPLO

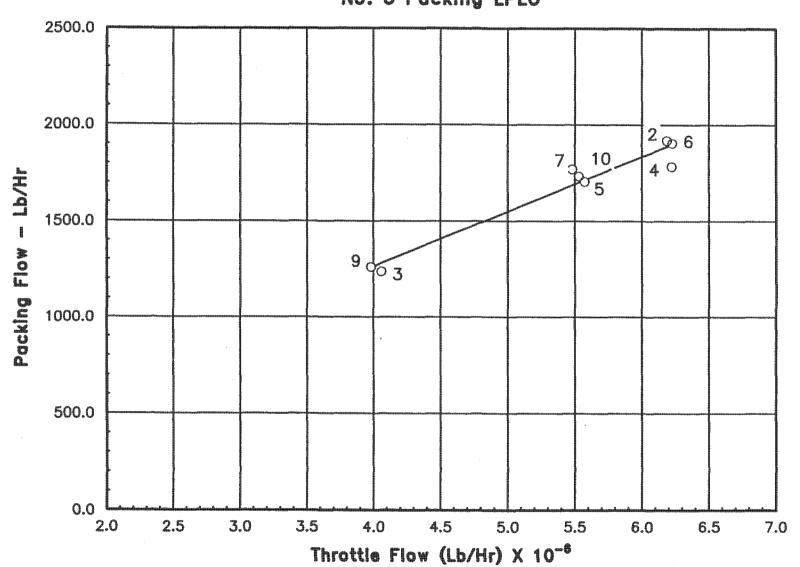


Unit No. 2 T 151

No. 2 Packing LPLO



Unit No. 2 T 151 No. 3 Packing LPLO



Unit No. 2 T 151

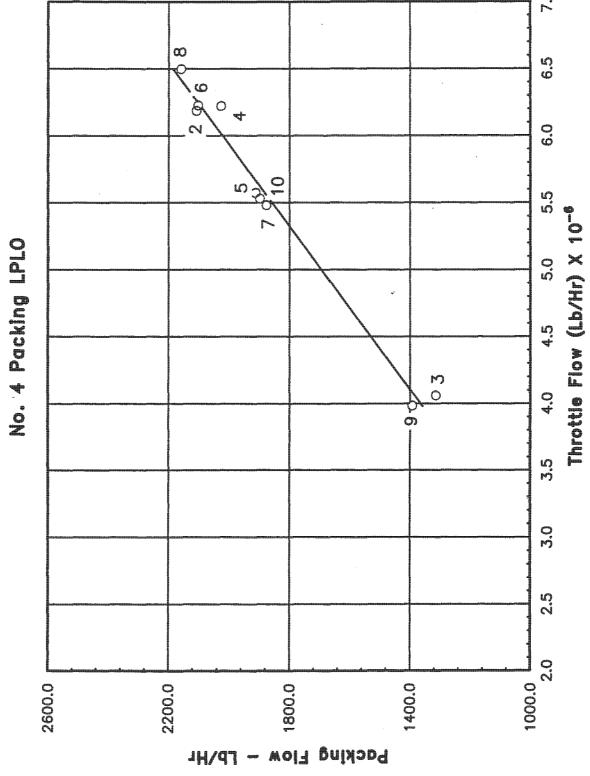


Fig. 34

-1013-8 (7-70)

# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

### APPENDIX A

Computer Output for Test Cycle Heat Balances for Test Points 2-10

### **Output Sheets**

These output sheets should be used in conjunction with the trunkline diagram shown in Figure A1.

The following is a list of the nomenclature used in these output sheets:

FW	Feedwater
Inj	Injection
Ret	Return
MU	Makeup
LO	Leakoff
Shell	Conditions in turbine
Exh	Exhaust
AE	Available energy
ELEP	Expansion line end point
UEEP	Used energy end point
$v_{AN}$	Annulus velocity
TL	Trunkline
P	Pressure - psia
T	Temperature - degrees F
H	Enthalpy, BTU/LB
Q	Flow, lb./hr.
SV	Specific volume - ft <sup>3</sup> /lb
SSR	Steam seal regulator

Pages 1 and 2 of the output sheets for each test point contain general information on turbine and cycle performance, such as heat rate, throttle flow, section efficiencies, and stage flow function. On page 1 under label "rated conditions", the load and heat rate have been corrected to rated power factor and rated  $\rm H_2$  pressure, and the throttle flow has been corrected to 2400 psig/1000F.

Page No. A1
Property of General Electric Company
Maintain one-inch side margins.

(013-8 (7-70) PHOTO OFFSET-TOS

# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

Pages 3-6 include designated component information. The column (TL) to the left of each sheet is a trunkline number used to easily identify points in the cycle. These TL numbers correspond to the number on sheet A1.

Pages 7 and 8 are a tabulation of all information stored in all trunklines. Although much of the same information is already included on pages 3-6, it is reprinted in TL form because not all TL numbers are printed on pages 3-6 and it is easier under some circumstances to look up information on the TL printout.

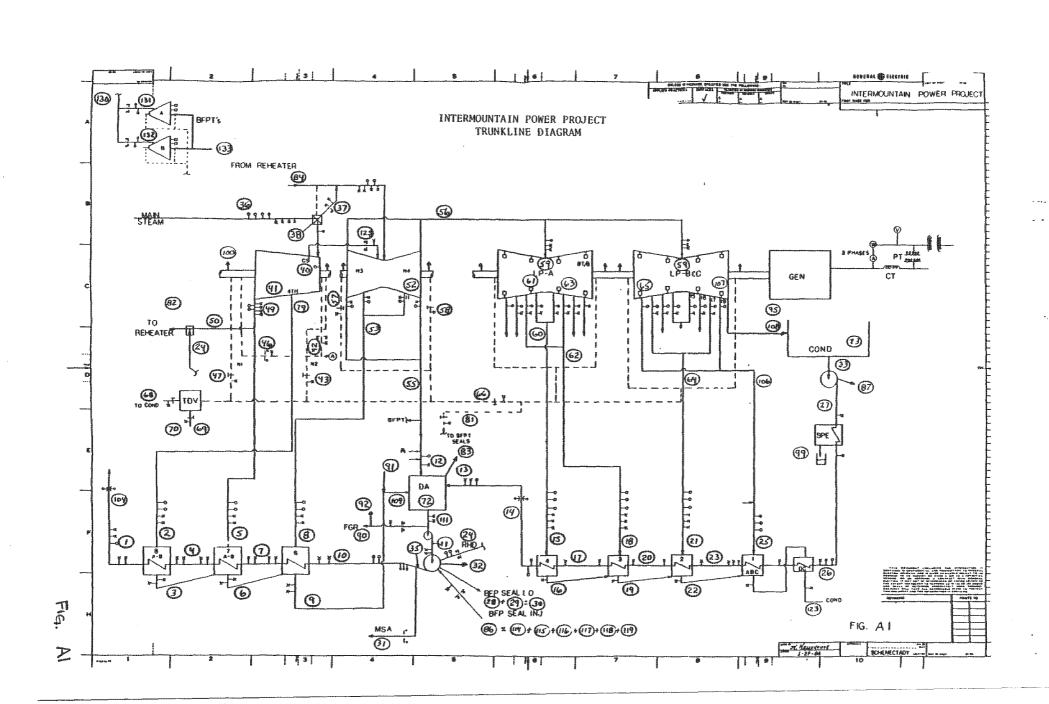
The column headings for the TL sheets are from left to right (TL) trunkline number, (P) pressure-psia, (T) temperature -  $^{\circ}$ F, (H) enthalty - Btu/lb., (Q) flow lb./hr., (SV) specific volume-ft<sup>3</sup>/lb. in most cases, (SP) an additional fluid property needed in the calculation such as enthalpy, (PV)-(P)/(SV) in most cases but not all; and (TR) transient storage for information needed in the calculation. This last storage area will also contain (Q)/A  $\sqrt{(P)/(SV)}$ 

The page numbering system is as follows:

A0 3-1

where A is for appendix A and 3-1 identifies the test point as 3 and the page number as 1.

Page No. A2
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Maintain one-inch side margins.



### TEST CYCLE HEAT BALANCE

 VALVE POINT
 VWO
 05/11/87
 TEST POINT
 02

 INTERMOUNTAIN PWR PROJECT
 UNIT #2

 820000. KW
 TC6F-30
 IN LSB
 TURBINE NO
 270T151

 2400. PSIG
 1000./ 1000. F
 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 855960. 855119. HEAT RATE 7855.9 7863.6 THROTTLE FLOW 6183909. 6285838.

### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	REHEAT TB				
			IF TE			LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH	
FRESS	2384.10	566.00	521.40	118.50		3.739	
TEME	1004.90	625.10	999,59	617.20	)	122.95	
ENTH	1464.67	1309.24	1519.47	1336.96	<b>&gt;</b>	1032.15	
ENTR	1.5364		1.7320	1.747	L		
gar free free	87.	. 952	91.926		94.	023	
ABSCISSA	PHPX/PT=0.2	374	P1STSTG/PT=0.80	45	VAN=	518.0	

THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY RHT TB	' BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	518.30	326.99		
H ELEF	1032.15		1032.15	•
H UEEF	1040.68		1040.68	
EFF ELEP	94.02	93.22	94.02	93.22
EFF UEEF	92.38	90.61	92.38	90.61
VAN	518.03		518.03	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED FOWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A02-1

### T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TO ENERG	Y BALANCE LP TB	LP TB ENERGY	BALANCE LP TB
H ELEP	1034.72		1034.72	hand than
H UEEF	1043.26		1043.26	
		سس پس		C) C) A 77
EFF ELEF	93,53	92.43	93.53	92.43
EFF UEEF	91.88	89.82	91.88	89.82
VAN	519.45		519.45	

### STAGE FLOW FUNCTION

STE		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	· Q/AP H SHL
4	1918.00	0	ň	٥.	86.6	0.	6123308.	1007.1
4	1086.39	0. 4.282	0. 1.24	1072.90	157.4	848.4	5525420.	843.1
RH 1	521.40	0.	0.	0.	350.2	0.	5012929.	799.9
8	510.97	0.	0.	0.	350.2	0.	5030848.	819.0
11	233.00	0.811	1.11	230.40	711.2	790.7	4798678.	780.J
15	118.50	O.	O.	0.	807.6	0.	4277024.	1122.2
15	65.19	0.287	1.28	64.36	1414.8	1086.5	4137685.	1059.4
16	39.70	0.189	1.38	39.15	2021.4	1101.9	3856782.	1076.4
18	11.64	0.057	1.43	11.48	6018.0	1079.4	3715227.	1042.3
19	5.01	0.021	1.19	4.95	12096.0	1118.8	3594785.	1112.1

		F E E D W	ATER	CYCLE			
$\mathcal{Z}$	EXTR	1042.50	795.70	1383.93	HE 6161067.4 579451.5 579451.5	TD =	-0.1
5 6	EXTR DRAIN	553.10 553.10	624.30 403.30	1309.77 379.00	HE 6161067.4 544362.4 1123813.8 579451.5	TD = DC =	-1.0
8 9	EXTR DRAIN	228.70 228.70	799.80 352.80	1424.20 324.84	HE 6161067.4 232170.1 1355984.0 1123813.8	TD = DC =	-1.3
86 30 32 24	SEAL INJ SEAL RET LEAKAGE EXTR	0. 0. 0. 1500.00	0. 0. 0. 200.00	o. o. o. 171.47	6147184.2 110957.1 65681.0		
12 111	FW IN EXTR DRAIN ENTRY	118.30 118.30	617.90	1337.32	4513807.5 278489.7 7143589.9	STO = SC =	797.0
15	FW IN EXTR DRAIN	173.80 63.26 63.26	264.00 514.70 268.60		HE 4513807.8 139338.8 139338.8	TD =	
18 19	FW IN EXTR DRAIN ENTRY	173.80 38.23 38.23 63.26	196.10 413.70 205.20 268.60	164.54 1243.33 173.37 237.57	HE 4513807.8 280903.0 420241.8 139338.8	TD =	3 0.5 9.1
21 22	FW IN EXTR DRAIN ENTRY	173.80 11.04 11.04 38.23	160.50 233.50 167.90 205.20	128.86 1162.08 135.88 173.37	HE 4513807.8 141555.3 561797.2 420241.8	TD =	1.8 7.4

T	L.		PRESS	TEMP	ENTH	FLOW	
70 68	TDV TDV		2.21	0. 660.40 470.00 MEAS TOTA	1365.02 1274.35		
25 123 22	FW IN EXTR DRAIN ENTRY ENTRY		4.86 4.86 11.04	o. 134.20	1087.61 102.16 135.88	HEATER 1 4513807.8 CLOSED 120442.1 TD = 0.6 686389.1 DC = 5.5 561797.2 4149.8	
33 87 27	LEAKA(	ЭE.	o. o. o.		O.	FUMF 4624764.8 0. 4624764.8	
						FW TO BOILER	
1	FW IN		2728.40	552.10	549.07	6161067.4 S+L = -8551.	
			Т	URBIN	EEXPA	NOICN	
71 36	EXIT THROTTL	_E	0. 2384.10	0. 1004.90	1464.67 1464.67	MAIN STEAM LINE O. 6183909.3	
						VALVE STEM LKG	
37	LO NO	1	521.60	897.90	1464.67	SQRT P/V = 85.583 2772.2 C = 55.714	
38	LO NO	2	٥.	O.,	Ο.	SQRT P/V = 18.640 1996.0 C = 107.081	
40 112	SHELL EXTR		1918.00	9 <b>42.</b> 33 0.	1440.06 1440.06	EXP TO STG 1 6123307.6 55833.4	•
						PACKING NO 2	
42	LO NO	1	123.17	700.00	1378.36	SQRT F/V =.115E 19 13574.6 C = 0.000	
43	LO NO	2	17.14	690.50	1379.04	SQRT F/V = 4.718 4273.7 C = 1030.390	
100	LO NO	. <u></u>	٥.	0.	0.	SQRT F/V = 0.655 587.4 C = 1769.447	

T.L.	FRESS	TEME	ENTH	FLOW
41 SHELL	1086.39	0.	1384.71	EXP TO STG 4 5525420.4
79 EXTR				579451.5
				PACKING NO 1
46 LO NO 1	121.87	609.30	1332.80	SORT P/V = 23.281 4789.9 C = 378.653
47 LO NO 2	17.02	589.20	1329.88	SQRT P/V = 4.874 3438.1 C = 825.981
100 LO NO 3	0.	0.	٥.	SQRT $P/V = 0.682$ 587.4 $C = 1769.447$
49 EXH	566.00	625.10	1309.24	EXPAND TO EXHAUST 5554519.3
80 EXTR	566.00			544362.4
50 TO RHT	566.00	625.10	1309.24	5010154.9
BEFORE LO	0.08	0.	1519.83	REHEATER 1
37 ENTRY				
84 AFTER LO	521.40	1000.20	1914.80	5012929.1 PCTDF = 7.880
51 ENTRY	510.97	999.02	1519.47	EXPAND TO BOWL 5030848.4
125 ENTRY	529.52	827.00	1426.65	17919.2
52 SHELL	977 AA	0	1/1/1/70	EXP TO STG 11
53 EXTR				
				PACKING NO 3
57 LO NO 1	16.99	634.30	1351.68	SQRT P/V = 4.719 1919.2 C = 1102.299
58 LO NO 2	17.00	643.40	1356.09	SQRT P/V = $0.666$ 2108.0 C = $4926.706$
100 LO NO 3	O.,	Ŏ.,	٥.	SQRT P/V = $0.664$ 587.4 C = $1769.447$
100 LO NO 4	0.	Ο.	Ο.,	SQRT $P/V = 0$ . 587.4 $C = 1769.447$

TI	PRESS	TEMP	ENTH	FLOW	
56 EXH 55 EXTR				EXPAND TO EXHAUS 4277024.0 516452.4	Т
59 ENTRY	118.50	617.20	1336.96	EXPAND TO BOWL 4277024.0	
61 SHELL 60 EXTR	65.19 64.36			EXP TO STG : 4137685.2 139338.8	15
63 SHELL 62 EXTR -	39.70 39.15			EXP TO STG : 3856782.2 280903.0	16
65 SHELL 64 EXTR			1141.41 1161.88		18
107 SHELL 106 EXTR	5.01 4.95	o. o.	1088.57 1087.61		19
TL	PRESS	TEMP	ENTH	FLOW	
108 TB EXH 76 ENTRY 122 DRAIN	1.84 0. 0.	122.95 0. 0.	1040.6816 0. 0.	— · · · · · · · · · · · · · · · · · · ·	<b>1</b>
					1 1
MEASURED LOA SHAFT 1 KV			PF = 0.98 FL =4353.0		

# F E R F O R M A N C E

-1-1	P	<del></del>	L	О	SV	c: <b>c</b> :	PV	TR
	2728.4	EEO 1	549 1	A1A10A7	5V 0.0213	0	n.	-8551 0
	1062.5	795.7		579451.		551.990	-0 110	243 7
	1042.5				0.0200	0.	7.300	0.
	2728.4	478.5	መፈሞ ማ	<b>ムイムイのムツ</b>	£73	<i>(</i> **)	ó.	ő.
	553.1	624.3	1700.2	5443A7	1.0701	477 533	-0.967	0. 146.8
 6		403.3	770 A	1123814.	0.0186	0.	8.800	0.
	2728.4	394.5	2770 T	A1A10A7	0.0100	ő.	0.	o.
8		799.8	1474 7	232170	0. 3.2200	393,208	0. -1.292	406.6
	228.7	352.8	TOA 9	232170.	0.0180	0,0,200	7 7ÖÖ	9 <sup>86</sup> c
	2824.0	TAR 1	327.0	A1A10A7	0.0180 0.0177	Ő.	o.,	0.
	O <sub>4</sub>	0.	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	6147184	0.04//	ŏ.	Ŏ.	Ŏ.
12	118:3	417 C	4 2 2 7 2	279490	0. 5.3338 0.0174 0.0174	340 195	0. 797.000	ב דדי
13	127.5	295.8	DAE E	4513808	0.0000	070.170	7 7 7 8 5000	
14	173,8	205 8	245 A	4513808 4513808	0.0174	1 014	o. o.	173 B
15	43.3	E14 7	1790.1	170770	♥ 0533	296.184	0.384	218 5
16	63.3	740 4	2270.1	120220	0.0172	2/U.IUT	4.600	0.
17	173.8	266.0		4513808	9.0533 0.0172 0.	0.	0.	ő.
18	38.2	413.7	1243.3	TOLOGOU.	17 7701	264 E28	ŏ.528	140 0
19		205.2	177 /	420242	0.0167	207,020	9.100	7-712 (1)
20		104 1	14/ 5	7513000	0.018/	o.	0.	0.
	11.0	233.5	1140 1	1/1455	77 N770	107 014	1.814	75 A
22	11.0						7.400	20.6
23		160.5	100.7	JOI/7/:	0.0164 0.	. 0	0.	0.
	1500.0	100.0	171 =	MOIGODO.	O 0444	0.	o.	0.
		200.0	1/1.0	100440	0. 0.0166	141 044	0.564	-161.1
	4.9	0. 128.7	1087.0	120442.	0. 0.0162 0. 0. 0.	101.004	0.064	0.
26		125.7	7/**	4013808.	0.0162	0.	o.	0.
27	○. ○.	0.	٥.	4024/00.	O.,	٥.	o.	0.
28		0.	٥.	18/20.	0.	0.	0.	
29	O.	0.	0.	46738. 65681.	0.	0.	0.	0.
30	0. 2835.9						0.	0.
			318.5	01070 <sub>1</sub>	0.01//	0.	0.	
	0.	o. o.	O.	4624765. -8551.	o.	0.	0.	o. o.
34	0.	U.	701 5	-6001.	0.0177	O .	0.	0.
		1004.9	4/1/0	017240U.	O.OI//	. 4 minimin minimin	85.583	0.
37		897.9	1404"/	0100707.	1.5012	'	18.640	55.7
			0.	1996.		0.760	0.	107.1
38	0. 2384.1	O.		6179141.	o. o.3255	0.	85.583	0.
							70.211	0.
	1918.0	942.3		6123308. 5525420.		147.682 555.122		843.1
41 42	123.2	0.			0.6266 5.5340	0.779	41.638 4.718	
		700.0	1378.4					0.0
43	17.1	690.5	1379.0		39.8960	0.	0.455	1030.4
45	0.	0. 400 7	0.		O. = 1711	o. o.703	0. 4 074	O.
46		609.3	1332.8	4790.	5.1311		4.874	378.7
47	17.0	589.2	1329.9		36.6111	o. 0	0.682	826.0
48		0.		5563335.	0.	0.	O.	0.
49	566.0	625.1		5554519.	1.0443	479.972	23.281	0.
50	566.0	625.1		5010157.	0.	O.	0.	٥.
51	511.0	999.0	1217.2	5030848.	1.6614	0.	17.541	0.

TL	F'	T	Н	Ω	SY	SP	F۷	TR
52	233.0	O	1414.8	4798678.	3.1161	395.222	8.647	780.3
53					3.1996		8.486	
		617.2		7707776	5.3210	Ö		Ō.
54								ŏ.
55		620.2	1338.3	516452.	5.2071	342.138		
56	118.5	617.2	1337.0	4277024.	5.3210	340.322		
57	17.0	634.3			38.2676			1102.3
		643.4	1356.1	2108.	38.5658	O.	0.664	4926.7
59		617.2	1337 0	4277024	5.3210	0.	4.719	0.
	64.4				8.9984			Ó.
		Ö.			8.5545			
62		421.3			13.2395		1.720	
63		Ο.			12.6351			
64	11.5	233.4	1161.9	141555.	35.5932	199.798	0.568	0.
65	11.6	0.	1141.4	3715227.	33.1879	200.920	0.592	1042.3
66		636.2			39.1192			O.
		7/0:2	1101 4	,000.	3.7941	Ŏ.	Ŏ.	O.
67		ara a	1171.0	V =	OEZZTI	MARK.		
					251.0113			٥.
					130.5876			Θ.
		660.4			130.5876			0.
71	0.	0.	1464.7	0.	0.	O.	O.	0.
75	0.	Ο.	0	797.	0.	O.	0.	Ο.
	0	Ŏ.*	0.	_0440	Ŏ.	ŏ	o.	
		Ο.	· · · ·	- 7G4G.	*** =	****	Ŏ.	~
	0.	(,) <sub>*</sub>	Ų,	6061.	v.	O.	O *	
76							O .	
							41.119	
80	566.0	625.1	1309.2	544362.	0.	O.	Ο.	٥.
							O.	
							0.	
							o.	
84					1.6281			799.9
				110957.			Ο.	
88	0.	0 ,	Ο.	4150.			O.	
90	148.3	340.1	311.4	٥.	0.0179	O.	Ο.	0.
91	139.1	245.6	214.4	996406.	0.0170	0.647	0.	139.1
	1.8	122 8	1032 1	3594785	173.0669	1040, 682	3.739	518.0
							o.	
77	Δ.	0.	· ·	OTOL.	0.	~ * *	ŏ.	1769.4
					0.0213		U.	2728.4
106	5.0	0.	1087.6	120442.	70.9891	161.828	0.264	0.
107	5.0	ં.	1088.6	3594785.	70.1785	0.	0.267	1112.1
108	1.8	122.9	1040.7	3594785.	188.2706	1040.682	3.739	-9648.0
109	0.	0.	278.0	2352390.	0.	o.	0.	٥.
111	118.3	340.1	311.4	7143590.	0.0179	0.	0.095	0.
110	0	0	1440 1	55833	0	Ö.	0.	0
4 4 ***		Ŏ.	# TH W # #	4104077	0.	Ŏ.	A 1155 10	ŏ.
11.0	2=	40000	O's	4.001	20 a 20 a 7 a 7	'\' # ''\ / !!' \	0.115E 19 0.	71 4 4 7
1.14	411.6	128.0	97.0	14910.	0.0162	0.624	O.	41110
115	411.6	128.0	97.0	8971.	0.0162	0.624	0.	411.6
116	411.6	128.0	97.0	28375.	0.0162	0.623	O.	411.6
117	411.6	128.0	97.0	13843.	0.0162	0.660	0.	411.6
118	411.6	128.0	97.0	22578.	0.0162	0.660	Ο.	411.6
110	411 6	128 0	97 0	22274	0.0162	0.660	0.	411.4
a more	~	# ##### # "#"	77.0	/1 "7 / C"\	O a O a Coac	0.000	o.	
1.40	O,	V.	y.	4/00.	<b>∵</b> .	O.	0.	
122	O.	O.	O.	4624765.	O.	0.	U.	O.
123	4.9	134.2	102.2	686389.	0.0163	Ο,	o. 5.500 o.	O.,
125	529.5	827.0	1426.6	17919.	1.3913	0.628	0.	515.5
130	0.	0.	0.	256327.	0.	O.	0.	٥.
1771	119.3	617 B	1337 つ	131773	5. 2878	1.019	o. o.	119.3
4 444	110 1	A17 =	Authority a sec	105057	E COET	1 010	o.	119 1
شدند بار ساس	およフェル	O1/.U	1-1-1-1 	TZJVD4.	പു കുടുവിച്	# # W # 7	~ ·	** / * *
100	O.	0.	Q.,	255/40.	o.	اریا مدرست بدر پیسر	O.	0.
201	0.1	0.	1519.8	.O.*	Q.	210.590	Ο.	O.

VALVE POINT 2ND VL INTERMOUNTAIN PWR PROJECT 05/13/87

TEST POINT 03

820000. KW

TC6F-30 IN LSB

UNIT #2 TURBINE NO 270T151

2400. PSIG

1000./ 1000. F

2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

# COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD HEAT RATE THROTTLE FLOW

592031. 7980.0 4056100.

591526. 7986.8 4099223.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	REHEAT TB				
			IP TB		LP TB		
	THROTTLE	COLD RHT	INLET	EXH		EXH	
PRESS	2399.80	384.30	354.00	81.02		3.074	
TEMP	1007.20	566.80	1000.44	621.20	)	115.92	
ENTH	1465.68	1289.21	1524.83	1341.35	i	1046.78	
ENTR	1.5365		1.7775	1.7925	5		
	81.	515	92.000		94.	013	
ABSCISSA	PHPX/PT=0.18	501	PISTSTG/PT=0.5148	<b>)</b>	VAN=	440.9	

### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERG	Y BALANCE LP TB	LP TB ENERGY	BALANCE LP TB
AE	508.50	316.38	NIII ID	haf" 1 K3
		410.40		
H ELEP	1046.78		1046.78	
H UEEP	1059.29		1059.29	
EFF ELEP	94.01	93.10	94.01	93.10
EFF UEEP	91.55	89.15	71.55	89.15
VAN	440.89		440.89	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A03-1

# T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TB ENERGY	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
H ELEP	1048.96		1048.96	
H UEEP	1061.46		1061.46	
EFF ELEP	93.58	92.42	93.58	92.42
EFF UEEP	91.13	88.47	91.13	88.47
VAN	441.89		441.89	

STE NC		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1235.50	O.	0.	0.	86.6	٥.	4014276.	999.8
4	718.77	1.959	0.86	712.60	157.4	832.0	3673957.	828.4
RH 1	354.00	0.	0.	0.	350.2	,0.	3375577.	796.7
8	346.92	0.	0.	0.	350.2	0.	3387567.	815.7
11	157.60	0.499	1.01	156.00	711.2	791.5	3238282.	782.2
15	81.02	0.	0.	O.	807.6	0.	2910222.	1122.1
15	44.64	0.156	1.01	44.19	1414.8	1087.0	2825494.	1064.1
16	27.27	0.110	1.17	26.95	2021.4	1105.3	2648608.	1084.7
18	7.96	0.035	1.27	7.86	6018.0	1097.7	2558119.	1053.2
19	3.48	0.007	0.62	3.46	12096.0	1111.6	2497392.	1108.1

- 9	-	garan.	green	The second		A 1	mg**	Rente.	green,	 	Tarrell .	0	-
á	-	in .	lane.	4.3	41.1	6.3		il-m-	R	 v		4	gian.

					HE	ATER	8
4	FW IN	2598.00	441.40	422.30	4060147.6	CLOSED	
2	EXTR	708.80	720.70	1357.50	326721.3	TD =	-4.0
3	DRAIN	708.80	445.80	425.69	326721.3	DC =	4.4
					HE	ATER	7
7	FW IN	2598.00	365.10	341.35	4060147.6	CLOSED	
5	EXTR	376.80	566.00	1289.43	319656.0	TD =	-2.6
6	DRAIN	376.80	371.10	344.36	646377.3	DC =	6.0
3	ENTRY	708.80	445.80	425.69	326721.3		•
					HE	ATER	6
10	FW IN	2728.40	316.30	291.30	4060147.6	CLOSED	
8	EXTR	155.70	800.90	1427.81	149285.1	TD =	-3.7
9	DRAIN	155.70	321.70	292.28	795662.4	DC =	5.4
6	ENTRY	376.80	371.10	344.36	646377.3		
					F	UMP	
11	FW IN	0.	0.	0.	4021693.2		
86	SEAL INJ	0.	٥.	0.	93029.4		
30	SEAL RET	0.	0.	0.	54575.0		
32	LEAKAGE	0.	٥.	0.	0.		
	EXTR	1500.00	246.50	218.13	0.		
35	FW OUT	2728.40	316.30	291.30	4060147.6	•	
35	FW OUT	2728.40	316.30	291.30			
					HE	ATER	5
13	FW IN	89.01	272.80	241.90	HE 3044763.5	ATER OPEN	
13 12	FW IN	89.01 80.19	272.80 617.90	241.90 1339.77	HE 3044763.5 182250.9	ATER OPEN STO =	778.4
13 12 111	FW IN EXTR DRAIN	89.01 80.19 80.19	272.80 617.90 312.50	241.90 1339.77 282.62	HE 3044763.5 182250.9 5171452.2	ATER OPEN	
13 12 111	FW IN	89.01 80.19	272.80 617.90	241.90 1339.77	HE 3044763.5 182250.9	ATER OPEN STO =	778.4
13 12 111	FW IN EXTR DRAIN	89.01 80.19 80.19	272.80 617.90 312.50	241.90 1339.77 282.62	HE 3044763.5 182250.9 5171452.2 1945421.4	ATER OPEN STO = SC =	778.4 -0.3
13 12 111 109	FW IN EXTR DRAIN ENTRY	89.01 80.19 80.19 0.	272.80 617.90 312.50 0.	241.90 1339.77 282.62 247.45	HE 3044763.5 182250.9 5171452.2 1945421.4	ATER OPEN STO = SC =	778.4
13 12 111 109	FW IN EXTR DRAIN ENTRY	89.01 80.19 80.19 0.	272.80 617.90 312.50 0.	241.90 1339.77 282.62 247.45	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8	ATER OPEN STO = SC = ATER CLOSED	778.4 -0.3
13 12 111 109	FW IN EXTR DRAIN ENTRY FW IN EXTR	89.01 80.19 80.19 0.	272.80 617.90 312.50 0. 243.30 514.70	241.90 1339.77 282.62 247.45 212.01 1291.86	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8 84727.4	ATER OPEN STO = SC = ATER CLOSED TD =	778.4 -0.3 4
13 12 111 109	FW IN EXTR DRAIN ENTRY	89.01 80.19 80.19 0.	272.80 617.90 312.50 0.	241.90 1339.77 282.62 247.45	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8	ATER OPEN STO = SC = ATER CLOSED	778.4 -0.3
13 12 111 109	FW IN EXTR DRAIN ENTRY FW IN EXTR	89.01 80.19 80.19 0.	272.80 617.90 312.50 0. 243.30 514.70	241.90 1339.77 282.62 247.45 212.01 1291.86	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8 84727.4 84727.4	ATER OPEN STO = SC = ATER CLOSED TD = DC =	778.4 -0.3 4 -0.5 3.0
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY FW IN EXTR DRAIN	89.01 80.19 80.19 0. 131.80 43.47 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8 84727.4 84727.4	ATER OPEN STO = SC =  ATER CLOSED TD = DC = ATER	778.4 -0.3 4
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY FW IN EXTR DRAIN	89.01 80.19 80.19 0. 131.80 43.47 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8 84727.4 84727.4	ATER OPEN STO = SC =  ATER CLOSED TD = DC = ATER CLOSED	778.4 -0.3 4 -0.5 3.0
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR	89.01 80.19 80.19 0. 131.80 43.47 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8 84727.4 84727.4 HE 3044763.8 176886.0	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD =	778.4 -0.3 4 -0.5 3.0 3
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR, DRAIN	89.01 80.19 80.19 0. 131.80 43.47 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76	HE 3044763.5 182250.9 5171452.2 1945421.4  HE 3044763.8 84727.4 84727.4  HE 3044763.8 176886.0 261613.4	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD =	778.4 -0.3 4 -0.5 3.0
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR, DRAIN	89.01 80.19 80.19 0. 131.80 43.47 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76	HE 3044763.5 182250.9 5171452.2 1945421.4 HE 3044763.8 84727.4 84727.4 HE 3044763.8 176886.0	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD =	778.4 -0.3 4 -0.5 3.0
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR, DRAIN	89.01 80.19 80.19 0. 131.80 43.47 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76	HE 3044763.5 182250.9 5171452.2 1945421.4  HE 3044763.8 84727.4 84727.4  HE 3044763.8 176886.0 261613.4 84727.4	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	778.4 -0.3 4 -0.5 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN  FW IN EXTR, DRAIN ENTRY	89.01 80.19 80.19 0. 131.80 43.47 43.47 131.80 25.99 25.99 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30 178.60 414.90 185.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4  HE 3044763.8 84727.4 84727.4  HE 3044763.8 176886.0 261613.4 84727.4  HE	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC = ATER	778.4 -0.3 4 -0.5 3.0
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR, DRAIN ENTRY  FW IN	89.01 80.19 80.19 0. 131.80 43.47 43.47 131.80 25.99 25.99 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30 178.60 414.90 185.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4  HE 3044763.8 84727.4 84727.4  HE 3044763.8 176886.0 261613.4 84727.4  HE 3044763.8	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = CLOSED	778.4 -0.3 4 -0.5 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN EXTR	89.01 80.19 80.19 0. 131.80 43.47 43.47 131.80 25.99 25.99 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30 178.60 414.90 185.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4  HE 3044763.8 84727.4 84727.4  HE 3044763.8 176886.0 261613.4 84727.4  HE 3044763.8 90489.1	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	778.4 -0.3 4 -0.5 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16 23 21 22	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR, DRAIN ENTRY  FW IN EXTR DRAIN	89.01 80.19 80.19 0. 131.80 43.47 43.47 131.80 25.99 25.99 43.47	272.80 617.90 312.50 0. 243.30 514.70 246.30 178.60 414.90 185.70 246.30	241.90 1339.77 282.62 247.45 212.01 1291.86 214.87 146.89 1245.52 153.76 214.87	HE 3044763.5 182250.9 5171452.2 1945421.4  HE 3044763.8 84727.4 84727.4  HE 3044763.8 176886.0 261613.4 84727.4  HE 3044763.8	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	778.4 -0.3 4 -0.5 3.0 3 -1.1 7.1

TL	PRESS	TEMP	ENTH	FLOW	
48 TDV	1.85	0. 563.90 480.00 MEAS TOTA	12/9.09	2353.0 C 2353.0 TO 0. TO	SEAL REG ALCULATED D HEATER CONDENSER
26 FW IN 25 EXTR 123 DRAIN 70 ENTRY	171.00 3.44 3.44 1.57	125.10 0. 127.20 563.90	93.49 1094.42 95.16 1318.84	HEATI 3044763.8 C 60727.6 T 63080.6 D 2353.0	neen
33 FW IN B7 LEAKAG 27 FW OUT		o. o.	o. o.	PUM 3137793.2 0. 3137793.2	<b>.</b>
				FW '	TO BOILER
1 FW IN	2598.00	508.50	497.28	4060147.6 S	+L = -4047.
	Т	URBIN	EEXP	NOISNA	
71 EXIT 36 THROTTL	0. E 2399.80	0. 1007.20	1465.68 1465.68	MAII 0. 4056100.2	N STEAM LINE
71 EXIT 36 THROTTL	0. E 2399.80	0. 1007.20	1465.68 1465.68	0. 4056100.2	N STEAM LINE
				0. 4056100.2 VAL	VE STEM LKG
37 LO NO	1 354.20	888.64	1465.68	0. 4056100.2 VAL SQRT P 2281.2 C	VE STEM LKG  /V = 86.079 = 55.758  /V = 12.638
37 LO NO 38 LO NO	1 354.20 2 0. 1235.50	888.64 0. 849.55	1465.68 0.	0. 4056100.2 VAL SQRT P 2281.2 C SQRT P 2518.4 C	VE STEM LKG  /V = 86.079 = 55.758  /V = 12.638
37 LO NO 38 LO NO 40 SHELL	1 354.20 2 0. 1235.50	888.64 0. 849.55	1465.68 0.	0. 4056100.2 VAL SQRT P. 2281.2 C SQRT P. 2518.4 C	VE STEM LKG  /V = 86.079 = 55.758  /V = 12.638 = 199.263
37 LO NO 38 LO NO 40 SHELL 112 EXTR	1 354.20 2 0. 1235.50 0.	888.64 0. 849.55 0.	1465.68 0. 1409.00 1409.00	0. 4056100.2 VAL SQRT P 2281.2 C SQRT P 2518.4 C	VE STEM LKG  /V = 86.079 = 55.758  /V = 12.638 = 199.263  TO STG 1  ING NO 2  /V = 115E 19
37 LO NO 38 LO NO 40 SHELL 112 EXTR	1 354.20 2 0. 1235.50 0.	888.64 0. 849.55 0.	1465.68 0. 1409.00 1409.00	0. 4056100.2 VAL SQRT P 2281.2 C SQRT P 2518.4 C EXP 4014275.6 37025.0 PACK: SQRT P 9647.6 C	VE STEM LKG  /V = 86.079 = 55.758  /V = 12.638 = 199.263  TO STG 1  ING NO 2  /V = 115E 19 = 0.000  /V = 3.302
37 LO NO 38 LO NO 40 SHELL 112 EXTR 42 LO NO 43 LO NO	1 354.20 2 0. 1235.50 0. 1 84.08 2 13.68	888.64 0. 849.55 0.	1465.68 0. 1409.00 1409.00 1351.05 1353.91	0. 4056100.2  VAL  SQRT P. 2281.2 C  SQRT P. 2518.4 C  EXP  4014275.6 37025.0  PACK: SQRT P. 3385.9 C  SQRT P.	VE STEM LKG  /V = 86.079 = 55.758  /V = 12.638 = 199.263  TO STG 1  ING NO 2  /V = 115E 19 = 0.000  /V = 3.302

TL	FRESS	TEMF'	ENTH	FLOW
41 SHELL 79 EXTR		0. 722.70		EXP TO STG 4 3673956.9 326721.3
				PACKING NO 1
46 LO NO 1	83.16	542.80	1312.29	SQRT P/V = 16.123 3408.0 C = 374.646
47 LO NO 2	13.63	543.10	1308.00	SGRT P/V = 3.394 2068.6 C = 775.546
100 LO NO 3	٥.	٥.	0.	SQRT P/V = 0.558 563.9 C = 2117.000
49 EXH 80 EXTR 50 TO RHT	384.30 384.30 384.30	544.80 544.80 544.80		319454.0
BEFORE LO 37 ENTRY	0.08	٥.	1525.33	REHEATER 1
84 AFTER LO	354.00	1001.30	1525.29	3375577.0 PCTDP = 7.884
51 ENTRY 125 ENTRY	346.92 359.51	1000.05 757.60	1524.83 1396.77	EXPAND TO BOWL 3387546.6 11989.6
52 SHELL 53 EXTR		0. 803.30		
				PACKING NO 3
57 LO NO 1	13.63	627.10	1348.40	SQRT P/V = 3.211 1237.9 C = 1146.047
58 LO NO 2	13.63	641.10	1355.17	SQRT P/V = 0.536 1314.7 C = 4555.333
100 LO NO 3	O.	0.	O.	SQRT P/V = $0.533$ $563.9 \cdot C = 2117.000$
100 LO NO 4	٥.	٥.	0.	SQRT P/V = 0. 563.9 C = 2117.000

A03-5

TL	-	PRESS	TEMP	ENTH	FLOW	
	EXH EXTR		621.20 623.60	1341.35 1342.42	2910221.7	
59	ENTRY	81,02	621.20	1341.35		EXPAND TO BOWL 7
	SHELL EXTR			1282.30 1299.28		
	SHELL EXTR			1237.67 1250.49	2648608.2	
	SHELL EXTR			1144.85 1168.78		
	SHELL EXTR	3.48 3.46	o. o.	1093.58 1094.42	2497391.5 60727.6	
76 22	TB EXH ENTRY ENTRY DRAIN	1.51 0. 7.51 0.	115.92 0. 164.60 0.	1059.2922 0. 132.57 0.	2497391.5 283268.5 352102.6 3137793.6	6
						GENERATOR 1 SHAFT 1
		0 = 59203 = 601607		PF = 0.991 FL =4353.0		= 58.00 = 5223.5

# PERFORMANCE

TL	P	Т	Н	Q	SV	SP	PV	TR
	2598.0	508.5		4060148.		0.		-4047.4
2	708.8	720.7	1357.5	326721.	0.9166	504.477	-4.023	
	708.8			326721.		O.	4.400	
	2598.0			4060148.			٥.	0.
5		566.0	1289.4	319656.	1.5086	438.791	-2.609	127.2
6	376.8	371.1	344.4	646377.	0.0182	0.	6.000	
7	2598.0	365.1	341.3	4060148.	0.		0.	0.
8	155.7	800.9				361.381	-3.719	439.5
9	155.7			795662.	0.0177	0.	5.400	0.
10	2728.4	316.3	291.3	4060148.	0.0174	0.	0.	0.
11	o.	0.	0.	4021693.	O.	0.	0.	0.
12	80.2	617.9	1339.8	182251.	7.9129	312.204	778.400	305.7
13	89.0		241.9	3044764.	0.0172	0.	0.	0.
14	131.8	272.8	242.0	3044764.	0.0172	1.014	0.	131.8
15	43.5	514.7	1291.9	84727.	13.2309	272.313	-0.487	242.4
16	43.5	246.3	214.9	84727.	0.0170	0.	3.000	0.
17	131.8	243.3	212.0	3044764.	0.	0.	0.	0.
18		414.9	1245.5	176886.	19.8773	242.229	-1.071	172.7
19		185.7	153.8	261613.	0.0165		7.100	
20		178.6	146.9	3044764.	0.		0.	0.
21	7.5	238.6	1165.6	90489.	55.0083	180.006		58.6
22	7.5			352103.			18.500	
23				3044764.	0.	0.	0.	0.
	1500.0	246.5	218.1	0.	0.0169	o. o.	o.	0.
	3.4	0.	1094.4	4072B.	0.	146.922		
26		125.1	93.5	3044764.	0.0162	0.	0.	0.
27		0.	0.	3137793.	0.		0.	0.
28	o.	0.		16805.	0.	o.	o.	o.
29		o.	0.	37770.	0.	o.	0.	0.
30		0.	0.	54575.	0.	o.	o.	0.
	2835.9			0.			0.	0.
33	0.	0.		3137793.	0.	0.	0.	0.
34		o.				o.	0.	0.
	2728.4	316.3	291.3	4060148.			o.	o.
						1465.676		
37		888.6	1465.7	2281.	2.2175	0.780		
38		0.	0.	2518.	0.	0.	0.	199.3
	2399.8	0.		4051301.	• •	o.	86.079	0.
	1235.5			4014276.		,	46.362	0
41	718.8	0.		3673957.				
42	84.1		1351.0			0.779	3.302	0.0
43	13.7	638.5	1353.9			0.	0.535	1196.3
45	0.	0.	0.		0.	o.	0.	0.
46	83.2	562.8	1312.3	3408.		0.703	3.394	374.6
47	13.6	543.1	1308.0		43.7136	0.	0.558	775.5
48	0.	0.		3698992.	0.	ŏ.	0.	0.
49	384.3	566.8		3692952.		440.698	16.123	o.
50	384.3			3373296.		0.	0.	o.
51	346.9			3387567.		0.	11.859	o.
Second ratio	"out" > bred #8 4"	*****	40 had alon "TB fad	عد السالسة الشياسة الساكسة الساكسة ا	مشداسا استان ومناد	~ #	The state of the state of the	747 8

TL	F	Т	Н	n	SV	SP	PV	TR
52							5.821	
53	156.0	803.3	1429.0	149285.	4.7628	361.534	5.723	O.
54	81.0	621.2	1341.3	3234601.	7.8559	0.	3.211	٥.
55		623.6			7.7001			
56	81.0	621.2			7.8559			0.
57	13.6	627.1	1348.4	1238.	47.4065	0.	0.536	1146.0
58		1 / 1 4 4	awerer o	4940	40 A017	^	V E.A.	4555.3
							0.533	
59	81.0	621.2	1341.3	2910222.	7.8559	O.	3.211	0.
60	44.2	530.1	1299.3	84727.	13.2263	273, 323	1.828	٥.
61					12.6739		1.877	
62	27.0	425.5	1250.5	176886.	19.4038	244.258	1.179	٥.
63	27 3	o.	1237 7	2648608	18 4884	245, 3A3	1.208	1084.7
64							0.385	
65	8.0	٥.	1144.8	2558119.	48.8779	183.152	0.404	1053.2
66					47.4053			0.
								V.
67		315.0	1184.7	0.	5.4836	0.	0.	
68	1.8	480.0	1279.1	٥.	302.4288	0.	0.	٥.
					387.7559			
			1910.0		30/1/337	· ·	V.	
70	1.6		1318.8	2353.	387.7559	0.		0.
71	0.	0.	1465.7	0. 778.	O.	0.		0.
	0.	0		,	~			^
	0.	0.	٥.	//5.	0.	0.	0.	0.
73	0.	0.	0.	-5031.	0.	٥.	0.	0.
75	0.	0.	0.	4789.	0	0-	0.	٥.
		~	· ·	77777	<b>0.</b> ,	~	~	
76		U.	٥.	283268.	v.	O.	0.	0.
79	712.6	722.7	1358.5	326721.	0.9134	505.075	27.932	o.
80	384.3			319656.	Ο.	Ó.	0.	
			a market a state	~ ~ ~ ~		~ .	~ .	~ .
81	13.4	612.0	1541.1	0.	4/.54/1	0.	0.	0.
82	٥.	ο.	0.	3373296.	0.	0.	O.	0.
83	80.2	312.2	1193 1	205	0.	0.	0.	0.
					~ * * * * * *	~ · ·	40.000	
84			1979.9	33/33//.	2.4187	/. 554	12.098	796.7
86	0.	0.	0.	93029.	0.	0.	0.	٥.
88	Ο.	Λ	0	2353.	Δ.	0	0.	٥
		~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~		ation and their tall the	V #	•	O *	~ *
90		312.5	282.7	O.	0.0176	O.	0.	0.
91	114.8	247.7	216.4	1149759.	0.0170	0.647	0.	114.8
95	1.5				212.0179			
99	o.		٥.	6204.	0.	٥.	0.	٥.
100	0.	0.	0.	564.	0.	0.	0.	2117.0
104	2500 0				0.0202	1 029	0.	
106	3.5				100.7990			0.
107	3.5	0.	1093.6	2497392.	100.2007	0.	0.186	1108.1
108	1.5				226.3461			-5031.0
	0.			1945421.	O	0.	0.	0.
111	80.2	312.5	282.6	5171452.	5.4615	0.	-0.296	٥.
	٥.	0		37025.	0.		٥.	٥.
مشاه مای باید موسوعی بی	W #	~ *	1707.0	**************************************	· · · · · · · · · · · · · · · · · · ·			
	٥.	0.	0.	4000678.	O.	0.		O.
114	474.8	123.5	92.7	14413.	0.0162	0.624	0.	474.8
115	474.8			8053.			0.	474.8
116	474.8			26462.			0.	474.8
117	474.8	123.5	92.7	18791.	0.0162	0.660	0.	474.8
	474.8	123.5	02.7	^	0.0162	0.	0.	^
		المراجعة ا	72.1				0.	
119	474.8	123.5	92.7	o. 25311.	0.0162		0.	0. 474.8
120	0.	0	0-	4800.	O.	0.	0.	0.
122	0.	0.	^	3137794.	^	Δ.	0.	ō.
						0.		
		127.2	95.2	63081.	0.0162	0.	2.100	٥.
	359.5			11990.			0.	350.7
	0.	0.						0.
					0.			
131	81.4	617.9	1339.7	77380.	7.7968	1.018	0.	81.4
132	81.4				7.7916			81.4
در د	0.	<u> </u>	0.	134620.	O.			٥.
201	0.1	0.	1525.3	0.	0.	236.117	0.	0.

 VALVE POINT
 VWO
 05/13/87
 TEST POINT
 04

 INTERMOUNTAIN FWR PROJECT
 UNIT #2

 820000. KW
 TC6F-30
 IN LSB
 TURBINE NO
 270T151

 2400. PSIG
 1000./ 1000. F
 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 859850. 858986. HEAT RATE 7875.4 7883.3 THROTTLE FLOW 6220163. 6281116.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	REHEAT TB						
•					LP TE				
	THROTTLE	COLD RHT	· INLET		EXH		EXH		
PRESS	2394.00	571.20	526	.10	118.90		3.809		
LEMP.	1000.80	623.00	100	8.54	623.60	)	123.63		
ENTH	1461.62	1307.52	152	4.17	1340.15	;	1036.53		
ENTR	1.5339		1.	7343	1.7497	•			
ter for for	87.	. 890		91.778		93.	662		
ABSCISSA	PHPX/PT=0.20	386	P1STSTG/P	T=0.8046	<b>)</b>	=MAV	515.2		

### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENER	RGY BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
AE	520.63	327.60		
H ELEF	1036.53		1034.53	
H UEEF	1045.20		1045.20	
EFF ELEF	93.66	92.68	93.66	92.68
EFF UEEF	92.00	90.03	92.00	90.03
VAN	515.24		515.24	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA-AND TEMP. OF 1000 F.

A04-1

	TOTAL TE ENERGY	BALANCE	LF TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LF TB
H ELEF	1038.88		1038.88	
H UEEF	1047.54		1047.54	
EFF ELEF	93.21	91.96	93.21	91.96
EFF UEEF	91.55	87.32	91.55	89.32
VAN	516.51		516.51	

STG NG		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1926.20	Ö.	0.	0.	86.6	0.	6159187.	1006.3
4.	1088.56	4.272	1.24	1075.10	157.4	850.2	5560286.	844.9
RH 1	526.10	Ο.	0.	0.	350.2	0.	5041443.	799.8
8	515.58	0.	0.	0.	350.2	0.	5059466.	818.9
11	234.73	0.820	1.12	232.10	711.2	791.8	4825868.	782.1
15	118.90	O.	0.	0.	807.6	0.	4304371.	1129.1
15	65.64	0.289	1.28	64.80	1414.8	1089.6	4164668.	1064.6
16	39.97	0.191	1.39	39.42	2021.4	1105.0	3882181.	1082.1
18	11.70	0.058	1.44	11.53	6018.0	1086.5	3739758.	1046.4
19	5.03	0.020	1.13	4.97	12096.0	1125.8	3622591.	1119.5

Section 1	-	-	AL. F		-		***	p****,	C		proq	,	geome
£	gree.	jar.	1.1	111	6.3	- 1	ete.	fac g*	1 .	v	1 '	1	jan.
	and a	Deares	dus.	4.4	277		L	1 3	~	- 1	-	L.	L.

Д	FW IN	2762.80	479 10	463.91	HE 6224686.7	ATER	8
	EXTR	1065.00		1381.58	580635.6		0.4
	DRAIN	1065.00	486.30	471.76	580635.6		7.2
·	#51211111	also "sel" bood "bood" 68 "bal" "sel"	"The book from the second trans	~ ( / 3. 4 / W	had had be had had be had	<i>20</i> 00 000	f B dim
					HE	ATER	7
7	FW IN	2762.80	395.20	373.10	6224686.7		•
	EXTR	558.00	622.00	1307.96	551437.6		-0.6
6	DRAIN	558.00	404.00	379.76			8.8
2	ENTRY	1065.00	486.30	471.76	580635.6		
					HE	ATER	6
10	FW IN	2911.50	345.80	321.88	6224686.7	CLOSED	
8	EXTR	230.30	807.20	1427.95	233597.1	TD =	-1.4
9	DRAIN	230.30	353.50	325.58	1365670.3	DC =	7.7
ć	ENTRY	558.00	404.00	379.76	1132073.2		
					<b></b>	'UMF'	
11	FW IN	0.	0.	O .	6180136.6		
86	SEAL INJ	0.	0.	O.	110300.1		
30	SEAL RET	0.	O.	Ο.,	<b>65750.</b> 0		
32	LEAKAGE	0.	O.	0.	Ο.		
24	EXTR	1500.00	295.40	267.69	0.		
35	FW OUT	2911.50	345.80	321.88	6224686.7		
						ATER	5
1.3	FW IN	127.90	296.20	265.92	4534595.4		
12	EXTR	118.70	624.10	1340.41	280170.6		0.
111	DRAIN	118.70	340.50	311.78	7090343.3	SC =	-0.1
109	ENTRY	0.	0.	276.69	2275877.0		
						ATER	4
		174.90	264.40				
	EXTR	63.55		1292.84	139702.6		0.3
16	DRAIN	63.55	269.10	238.08	139702.6	DC =	4.7
						50 AMAN WAYS SEEL.	
am .11		4 200 00 00 00 00				ATER	3
	FW IN	174.90			4534595.7		~ 4
				19/18/70	282487.1	TD =	-0.1
19	EXTR	38.11	418.70				
	DRAIN	38.11	205.50	173.68	422189.7		9.2
	DRAIN	38.11	205.50	173.68	422189.7 139702.6	DC =	9.2
16	DRAIN ENTRY	38.11 63.55	205.50 269.10	173.68 238.08	422189.7 139702.6 HE	DC = ATER	
16 23	DRAIN ENTRY FW IN	38.11 63.55	205.50 269.10 160.60	173.68 238.08 128.97	422189.7 139702.6 HE 4534595.7	DC =  ATER CLOSED	9.2 2
16 23 21	DRAIN ENTRY FW IN EXTR	38.11 63.55 174.90 11.09	205.50 269.10 160.60 236.80	173.68 238.08 128.97 1163.62	422189.7 139702.6 HE 4534595.7 142423.2	DC =  ATER CLOSED TD =	9.2 2 1.8
16 23 21 22	DRAIN ENTRY FW IN	38.11 63.55	205.50 269.10 160.60	173.68 238.08 128.97	422189.7 139702.6 HE 4534595.7	DC =  ATER CLOSED TD =	9.2 2

TL	64u			PRESS	TEMP	ENTH	FLOW	
70	TE	.∨ )∨		3.15 0.29	651.90	1361.01 1279.24	3936.1 3821.2 114.9	TO HEATER
25 123 22	EXT DRA	R IN RY		4.88 4.88 11.09	0. 134.80 168.10	1091.45 102.76 136.08	4534595.7	TD = 0.6 DC = 5.1
87	LE	AKAC	βE		0.	0.	Fl 4644895.8 o. 4644895.8	
							Fl	V TO BOILER
4. .i.	FW	J IN		2762.80	551.90	548.78	6224686.7	S+L = -4523.
				Т	URBIN	EEXPA	NSION	
					o. 1000.80			AIN STEAM LINE
							VA	ALVE STEM LKG
37	LO	NO	1	524.30	892.55	1461.62		P/V = 86.150 C = 55.578
38	LO	NO	2	٥.	٥.	٥.,		P/V = 18.853 C = 105.928
				1926.20			E) 6159186.8 56188.6	(P TO STG 1
							PAC	CKING NO 2
42	LO	NO	1	123.86	<b>488.</b> 00	1372.30		F/V =.115E 19 C = 0.000
43	LO	NO	2	15.20	686.10	1376.99		P/V = 4.770 C = 971.961
100	LO	NO	3	٥.	٥.	0.		P/V = 0.582 C = 2057.052
								A04-4

The Land		PRESS	TEMF	ENTH	FLOW
					EXP TO:STG 4 5560286.2 580635.6
					PACKING NO 1
46 LO NO		122.51	605.70	1330.94	SQRT F/V = 23.538 4483.2 C = 355.283
47 LO NO	<u>.</u>	15.09	584.70	1327.85	SQRT P/V = 4.908 3275.0 C = 790.423
100 LO NO	500ge *****	٥.	<b>O</b> .,	٥.	SQRT P/V = 0.606 604.5 C = 2057.052
49 EXH 80 EXTR 50 TO RHI		571.20	623.00	1307.52	EXPAND TO EXHAUST 5590089.5 551437.6 5038651.9
BEFORE 37 ENTRY	LO	0.08	٥.	1524.56	REHEATER 1
84 AFTER	LO	526.10	1009.20	1524.53	5041442.9 PCTDP = 7.896
51 ENTRY 125 ENTRY			1007.97 822.60		EXPAND TO BOWL 5059465.5 18022.6
52 SHELL 53 EXTR		234.73 232.10	o. 808.80	1419.48 1428.70	EXP TO STG 11 4825848.4 233597.1
					PACKING NO 3
57 LO NO	1	15.05	636.40	1352.81	SQRT P/V = 4.720 1783.3 C = 1063.375
58 LO NO	2	15.08	647.70	1358.29	SQRT P/V = 0.590 2027.1 C = 5488.745
100 LO NO	3	٥.	٥.	٥.	SQRT P/V = 0.588 604.5 C = 2057.052
100 LO NO	4	0.	0.	0.	SQRT P/V = 0. 604.5 C = 2057.052

T.L.	PRESS	TEMP	ENTH	FLOW	
		·£			
56 EXH 55 EXTR	118.90 122.10	623.60 626.90	1340.15 1341.60	4304370.8	PAND TO EXHAUST
59 ENTRY	118.90	623.60	1340.15		EXFAND TO BOWL
61 SHELL 60 EXTR	65.64 64.80	o. 531.20	1282.19 1298.10	4164668.2	EXP TO STG 15
63 SHELL 62 EXTR			1237.49 1249.50	3882181.1	
65 SHELL 64 EXTR	11.70 11.53	o. 239.50	1145.04 1164.76	3739757.9	EXP TO STG 18
107 SHELL 106 EXTR	5.03 4.97	o. o.	1092.13 1091.45		
TL	PRESS	TEMP	ENTH	FLOW	
108 TB EXH 76 ENTRY 122 DRAIN	1.87 0. 0.	123.63 0. 0.	1045.2040 0. 0.	3622591.0 1017482.3 4644896.3	GENERATOR 1
MEASURED LOA SHAFT 1 KV	AD = 8598: V = 871730		PF = 0.98 FL =4353.0	9 H2	SHAFT 1. = 64.00 = 7527.1

### F E R F O R M A N C E

fr. 1	<b></b> ,	anger	1 1	, m	CI	SF	Eq. J	TR
1	7777 C		E40 0	64 67 67 67 67 67	0.0010	0	2"1	MAROT T
	1045.0	792.1		580434.	A Take Take Take	== 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.379	239.8
				580636.	0.0007	JJE:4/7	7.200	207.0 A
	1065.0				0.0200	O.,	<i>←</i>	,**,
	2762.8			6224687.	O.	o. 478.464	Q <sub>u</sub>	143.5
	558.0			551438.	1.0066	4/8.464		
	558.0			1132073.	0.0187	0.	8.800	O.
	2762.8	395.2	3/3.1	6224687. 233597.	O.	U.	0. -1.390	U.
	230.3				3.21/4	242*810	-1.370	413.4
	230.3	353.5	325.6	1365670.	0.0180 0.0177	O.,	7.700	O.,
	2911.5	345.8	321.9	6224687.	0.0177	0.	0. 0. 0. 0.	o.
	O "	. O.	0.	6180137.	O.	O	O.	O.
	118.7	624.1	1340.4	280171.	5.3481	340.448	Ο.	283.7
13		296.2	265.9	4534595.	0.0174	O.,	() . () .	О.
14			266.0	4534596.	0.0174	1.014	0.	174.9
15		520.3	1292.8	139703.	9.0660	296.486	0.286	223.8
1.6		269.1	238.1	139703.	0.0172	0.	4.700	0.
17	174.9	264.4	233.5	4534596.	0.	O.	0. -0.040	Ο.
18	38.1	418.7	1245.8	282487.	13.5632	264.340	-0.060	154.4
19	38.1	205.5	173.7	422190.	0.0167	O.	9.200	0.
20	174.9	196.3	164.7	4534596.	0.	o.	0.	0.
21	11.1	236.8	1163.6	142423.	37.0413	198.140	1.840	38.7
22	11.1	168.1	136.1	564613.	0.0164	٥.	7.500	O.,
23	174.9	160.6	129.0	4534596.	0.	0.	7.500 0.	0.
24	1500.0	295.4	267.7	0.	0. 0.0173	0.	o.	O.
	4.9	C)	1001 5	117147	<u> </u>	141 174	0 574	-161.2
26	222.7	170 7	98.2	4534596.	0.0162	0.	0.	0.
	0.	0.	0.	4644896.	0.	0.	Ö.,	Ο.
28	o.	U.	o.	18646.	O.	0.	0.	O.
29	o.	o.	0.	47104.	o. o. o.	0.	0.	o.
	ō.	o.	Ö.	47104. 65750.	o.	o.	o.	o.
	2923.9	333.9	309.7	0.	0.0176	o.	ō.	0.
	Ö.			4644896	0	o.	o.	o.
	Ŏ.	o. o.	o.	4644896. -4523.	o. o.	o.	o.	o.
	2911.5	345.8	321.9	6224687	0.0177	0.	o.	ó.
	2394.0		1461.6	6220163.	0.3226	1461.622	86.150	
37		892.6	1461.6	2791.	1.4807	0.780	18.853	55.6
38		0.	0.	1997.	0.	0.	0.	105.9
	2394.0	Ŏ.		6215375.		o.	84.150	0.
	1926.2	938.5		6159187.		146.478		
	1088.6	0.		5560286.				844.9
42				13629.		0.779	4.770	0.0
43		686.1	1377.0			0.	0.582	972.0
45	0.		0.		0.	ő.	0.	0.
46		605.7		4483.			4.908	355.3
47	15.1	584.7	1327.8		41.1273	0.	0.606	790.4
48	0.	0.		5578452.	0.	<u>.</u>	0.	Ů.
49	571.2	623.0		5590090.	1.0310	480.943	23.538	0.
50		623.0		5038652.		0.	0.	0.
51				5059466.		0.	17.642	0.
4.0	U.LU.O	エンシロ・シ	1444.4	~~~~~~~	1 = 00/0	5? w	1/: OTL	1.2 m

ongon y	p***.	****		an.		proc. proc.	prov. 4 . 2	ener: 4711
	ļ.,	!	H	<u>[6]</u>	50	DI"	PV	I FC
52							8.676	
53		808.8			3.1963		8.522	
54		623.6			5.3364		4.720	
55	122.1	626.9			5.2110	342.572	O.	0.
56	118.9	623.6					0.	
57	15.0	636.4	1352.8	1783.	43.2953	Ο.	0.590	1063.4
58	15.1	647.7	1358.3	2027.	43.6577	0.1	0.588	5488.7
59		623.6	1340.1	4304371.	5.3364	0.	4.720	0.
60		531.2	1298.1	139703.	8.9928	297.774	2.684	ô.
61	45.6	0.			8.5857	298.730	2.765	1064.6
62	39.4	426.7			13.2325	266.369	1.726	Ö.
63			1277 5	7882181	12 4904	2601007 267 383	1.775	1082.1
64	44 50	o. 239.5	1144 8				0.568	
65	11.7	O.	11/15 0	TTETECE	77 14OE	2001017	0.594	1046.4
66	4 /1 ***7	634.4	TITULU					
67		545.2	1401.7	71/0:	77.1000	O .	O.	O.
			1171.8	سابها سدد د	CCG/:C	Q.	o. o.	0
68	0.3	480.0	1.4/7.4	110.	1900.7420	€t. <sub>a</sub> .	(,) <sub>a</sub>	Q.
67	3.1	651.9	1361.0	1230.	210.3186	Q.	Ο.	O.
70	3.1	651.9	1361.0	3821.	210.3186	Q.	O.	Q.
71	0.	0.	1461.6	0.	0.	Ο.,	O.	o.
73	() *	0.	O.	-4823.	o.	o.	0.	0.
	0.	o.	0.	5552.	O.	0.	o. o. o.	Ο.
76		0.	0.	1017482.	0. 0.4305	O.	0.	O.
	1075.1	794.2	1382.4	580636.	0.6305	553.443	41.292	O.,
	571.2	623.0	1307.5	551438.	O.	0.	0.	0.
81	14.7	634.4	1351.9	٥.	44.1865	O.	0.	O.,
82	O *	Q.,	Ο.	5038652.	٥.	Ο.	O.	0.
83		340.4	1190.2	300.	0.	O.	0.	0.
84		1009.2	1524.5	5041443.	1.6241	7.896	17.998	799.8
86	O-,	O *	Ο.	110300.	0.	٥.	O.	0.
88	0.	O.	0.	3936.	0.	0.	0.	0.
90	148.7	340.5	311.8	0.	0.0179	0.	۰.	Ο.
91	139.3	234.7	203.3	910207.	0.0169	0.647	Ο.,	139.3
75	1.9	123.6	1034.5	3622591.	170.8108	1045.204	3.809	515.2
77	0.	Ο.	O.	6650.	0.	٥.	0.	0.
100	0.	0.	٥.	604.	Ο.	0.	o. o.	2057.1
104	2762.8				0.0212			2762.8
	5.0		1091.5		71.0138			0.
107		0.	1072.1		70.2487			
108	1.9						3.809	
109	0.	٥.			0.			
	118.7	340 S	711 0	7090343.	3.7666	0.	-0.052	
	٥.	Ö.	1437.3	56189.	0.	0.	0.	
113	0.	Ο.,	0.	6140922.	O.	0.	0.115E 19	
114			97-8	14783.	0.0162	0.624	0.	410.1
115	410.1	128.8	97.8	9013.	0.0162	0.624	Ō.	410.1
116	410.1	128.8	97.8	28198.	0.0162	0.623	o.	410.1
117	410.1	128.8	97.8	13915.	0.0162	0.660	o.	410.1
118	410.1	128.8	97 B	22392.	0.0162	0.660	Ŏ.	410.1
119		128.8	97 9	21999.			o.	410.1
	0.	0.	7,7,1	4788.	0.	0.		0.
122	0.	0.	0	4644896.	0.	O.	0.	0.
	<u>и</u> о			685601.		Ŏ.	5.100	
125	*****			18023.		0 ADD	0.	519.8
	0.		0.			0.020		0.
131								119.9
132	117.7			124889.				
133	0.			129531.				119.7
				253815.				0.
201	0.1	0.	1524.6	٥.	0.	217.041	0.	0.

VALVE POINT 3RD VL 05/14/87 TEST POINT 05
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC6F-30 IN LSB TURBINE NO 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

 TOTAL LOAD
 785980.
 785201.

 HEAT RATE
 7858.4
 7866.2

 THROTTLE FLOW
 5570279.
 5627468.

#### TURBINE THERMAL PERFORMANCE

	HIGH PR	ESS TB				
			IP T	В	LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2393.80	514.80	475.00	107.50		3.403
TEMP	1001.50	606.10	1005.50	622.90	)	119.54
ENTH	1462.09	1301.65	1524.01	1340.52	2	1036.93
ENTR	1.5343		1.7452	1.7610	)	
EFF	86.	. 181	91.58	3	93.5	569
ABSCISSA	PHPX/PT=0.2	151	P1STSTG/PT=0.7	161	VAN=	522.6

THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY	/ BALANCE LP TB	LP TB ENERGY	BALANCE LP TB
	RHT TB	LF IB	RHT TB	LP IB
AE	520.56	327.90		
H ELEP	1036.93		1036.93	
H UEEP	1045.45		1045.45	
EFF ELEP	93.57	92.59	93.57	92.59
EFF UEEP	91.93	89.99	91.93	89.99
VAN	522.60		522.60	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A05-1

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1039.18		1039.18	
H UEEF	1047.69		1047.69	
EFF ELEP	73.14	91.90	93.14	91.90
EFF UEEP	91.50	89.30	91.50	89.30
VAN	523 84		523.84	

STE NC		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1714.30	0.	0.	٥.	86.6	٥.	5515140.	1005.3
4	975.78	3.487	1.13	964.80	157.4	846.4	4998137.	841.6
RH 1	475.00	0.	0.	0.	350.2	0.	4546814.	799.0
8	465.50	0.	0.	0.	350.2	0.	4562958.	818.0
11	211.53	0.727	1.10	209.20	711.2	792.6	4354230.	783.1
15	107.50	0.	0.	0.	807.6	0.	3898551.	1131.7
15	59.41	0.244	1.19	58.70	1414.8	1091.7	3776322.	1067.5
16	36.23	0.165	1.32	35.75	2021.4	1107.7	3526673.	1085.9
18	10.60	0.051	1.40	10.45	6018.0	1092.9	3400059.	1051.2
19	4.55	0.017	1.06	4.50	12096.0	1130.0	3296859.	1124.0

Auren.	-	****	****		ADX.	0000	armor	eiter.	em.		deren.		eran-
=	-	-	13	iui.	43	1	-		С	v	11	-	-

					HE	ATER	8
4	FW IN	2679.90	469.20	452.85	5573373.4	CLOSED	
2	EXTR	955.00	771.40	1374.49	500222.7	TD =	-1.5
3	DRAIN	955.00	475.40	459.20	500222.7	DC =	6.2
							_
						ATER	7
•	FW IN	2679.90	387.20	364.57	5573373.4	CLOSED	
5	EXTR	503.00	605.10	1302.02	480036.8	TD =	-1.6
6	DRAIN	503.00	395.00	370.01	980259.6	DC =	7.8
3	ENTRY	955.00	475.40	459.20	500222.7		
		~,			g giften	ATER	6
4.0	771.1 7 h 1	000/ 70	AV	747 CA			Ω
	FW IN	2826.30	337.80	313.50	5573373.4	CLOSED	
	EXTR	207.70	805.10	1427.80	208728.4		-2.2
	DRAIN	207.70	344.70	316.32	1188987.9	DC =	6.9
6	ENTRY	503.00	395.00	370.01	980259.6		
					P	UMP	
11	FW IN	0.	0.	0.	5527238.3		
	SEAL INJ	o.	o.	0.	109560.8		
	SEAL RET	o.	o.	o.	63425.7		*
32	LEAKAGE	o.	0.	ŏ.	0.		
	EXTR	1500.00	276.90	248.86	0.		
35	FW OUT	2826.30	337.80	313.50	5573373.4		
فيبيه النبه	FW OUT	2020.00	007.00		44/44/4°		
					HE	ATER	5
13	FW IN	116.40	290.10	259.64	4086605.4	OPEN	
12	EXTR	107.30	622.40	1340.28	252175.2	STO =	257.4
111	DRAIN	107.30	333.10	304.04	6488791.0	SC =	-0.1
109	ENTRY	0.	0.	267.06	2150540.7		
							_
						ATER	4
	FW IN	161.80	259.00	228.00	4086606.2		
	EXTR	57.64	519.10	1292.77	122229.4		0.0
16	DRAIN	57.64	263.10	231.95	122229.4	DC =	4.1
					HE	ATER	3
20	FW IN	161.80	191.90	160.29	4086606.2		•
	EXTR	34.52	418.00		249649.0		-0.5
	DRAIN	34.52	200.50	168.64	371878.4		8.6
			4	231.95		DL	0.0
16	ENTRY	57.64	263.10	231.75	122229.4		
					HE	ATER	2
23	FW IN	161.80	156.60	124.94	4086606.2	CLOSED	
	EXTR	10.05	237.60	1164.34	126613.3		1.5
	DRAIN	10.05	163.70	131.67	498491.7		7.1
	ENTRY	34.52	200.50	168.64	371878.4		
~~ •							

TI	E94			PRESS	TEMP	ENTH	FLOW	
70	TI TI	V		4.54 2.03	676.10	1372.67 1279.07	3190.9 3190.9 0.	
25 123 22	EXT	AIN TRY		10.05		1092.40 99.06		TD = 0.4
33 87 27	LE	N IN EAKAG	ŝΕ	o. o.	o. o.	o. o.	P 4196167.0 0. 4196167.0	UMP
							grader grade grade	W TO BOILER
que	FV	V IN		2679.90	540.50	535.00	5573373.4	S+L = -3095.
				The state of the s	URBIN	EEXPA	NOION	
		T OTTL			0. 1001.50		0.	AIN STEAM LINE
							V	ALVE STEM LKG
37	LO	NO	1	475.20	890.02	1462.09		P/V = 86.110 C = 55.599
38	LO	NO	2	0.	0.	0.	SQRT 2137.1	P/V = 17.013 C = 125.620
40 112	SHE	LL R		1714.30	912.20 0.	1428.45 1428.45	5515140.0 50351.2	XP TO STG 1
							PA	CKING NO 2
42	LO	NO	1	112.39	674.00	1365.89		P/V =.115E 19 C = 0.000
43	LO	NO	2	16.85	670.50	1369.29	SQRT 3760.9	P/V = 4.353 C = 1005.031
100	LO	NO	3	0.	0.	٥.	SQRT 614.5	P/V = 0.650 C = 1879.144

TL	PRESS	TEMP	ENTH	FLOW
41 SHELL . 79 EXTR	975.78 964.80	0. 772.40	1374.59 1374.59	EXP TO STG 4 4998137.0 500222.7
				PACKING NO 1
46 LO NO 1	111.24	592.80	1325.23	SQRT P/V = 21.336 4437.6 C = 381.695
47 LO NO 2	16.79	572.30	1321.77	SQRT P/V = 4.482 3091.7 C = 826.983
100 LB NB 3	٥.	٥.	0.	SQRT P/V = $0.678$ 614.5 C = $1879.144$
49 EXH 80 EXTR 50 TO RHT	514.80	606.10 606.10 606.10	1301.65 1301.65 1301.65	EXFAND TO EXHAUST 5024200.4 480036.8 4544163.6
BEFORE LO 37_ENTRY	0.08	٥.	1524.43	REHEATER 1
	475.00	1006.20	1524.39	4546814.1 PCTDP = 7.731
51 ENTRY 125 ENTRY		1004.99 808.00		EXPAND TO BOWL 4562958.1 16144.0
52 SHELL 53 EXTR				EXP TO STG 11 4354229.8 208728.4
				PACKING NO 3
57 LO NO 1	16.76	634.10	1351.60	SQRT P/V = 4.266 1705.0 C = 1135.963
58 LO NO 2	16.77	646.40	1357.56	SQRT P/V = 0.657 1911.6 C = 4777.700
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.654 614.5 C = 1879.144
100 LO NO 4	0.	0.	0.	SQRT P/V = 0. 614.5 C = $1879.144$

TL		PRESS	TEMP	ENTH	FLOW	
		107.50 110.80	622.90 626.10	1340.52 1341.91	3898551.3	0
59 E	NTRY	107.50	622.90	1340.52	3898551.	EXPAND TO BOWL 2
	HELL XTR	59.41 58.70	0. 531.10	1282.79 1298.56	3776321.	EXP TO STG 15 7 4
63 S	HELL	36.23	0.	1238.23		EXP TO STG 16
	XTR	35.75	426.50	1249.87	249649.0	0
	HELL XTR	10.60 10.45	0. 242.30	1145.74 1166.43	3400059.5	EXP TO STG 18 5 3
						EXP TO STG 19
107 St		4.55 4.50	0. 0.	1092.98 1092.40		3
						CONDENSER SHAFT 1
76 E		1.67 0. 0.	119.54 0. 0.	1045.4450 0. 0.	3296858.8 895683.4 4196166.9	
						GENERATOR 1 SHAFT 1
MEAS!		) = 785980 = 797091.		PF = 1.000 FL =4353.0	-	= 64.00 = 6758.0

# PERFORMANCE

					sv		PV	
							٥.	
2	955.0	771.4	1374.5	500223.	0.7004	539.024	-1.476	232.4
3	955.0	475.4	459.2	500223.	0.0198	0.	6.200	0.
4	2679.9	469.2	452.8	5573373.	0.	0.	0.	٥.
5	503.0	605.1	1302.0	480037.	1.1586	467.626	-1.574	137.5
							7.800	
7	2679.9	387.2	364.6	5573373.	0.	0.	0.	0.
8	207.7	805.1	1427.8	208728.	3.5676	384.983	-2.217	420.1
9	207.7	344.7	316.3	1188788.	0.0179	0.	6.900	0.
10	2826.3	337.8	313.5	5573373.	0.0176	0.	0.	٥.
11	o.	0.	0.	5527238.	0.	٥.	0.	0.
12	107.3	622.4	1340.3	252175.	5.9163	332.958	257.400	289.4
13	116.4	290.1	259.6	4086605.	0.0174	0.	٥.	0.
14	161.8	290.1	259.7	4086606.	0.0174	1.014	0.	161.8
15							0.001	
							4.100	
							0.	
18	34.5	418.0	1245.9	249649.	14.9788	258.473	-0.527	159.5
							8.600	
							Ο.	
21	10.0	237.6	1164.3	126613.	40.9622	193.445	1.545	44.2
							7.100	
							0.	
24	1500.0	276.9	248.9	0.	0.0171	0.	0.	0.
25	4.4	0.	1092.4	103201.	0.	157.046	0. 0.446	-157.0
26	206.7	126.4	74.9	4086606.	0.0162	0.	0.	٥.
27	0.	0.	0.	4196167.	0.	0.	0.	٥.
	0.						0.	
	o.			45255.			0.	
30	0.	0.	0.	63426.	0.	0.	0.	Ο.
31	2833.0	303.5	278.5	0.	0.0173	0.	0.	0.
	0.	٥.	0.	4196167.	0.	0.	0.	0.
34		0.				0.		0.
35	2826.3	337.8	313.5	5573373.	0.0176	0.	0.	0.
						1462.094	86.110	0.
37	475.2	890.0	1462.1	2650.	1.6419	0.780	17.013	55.6
38	o.	0.	0.	2137.	0.	0.	0.	125.6
		0.		5565491.	0.3228	0.	86.110	0.
40	1714.3	912.2	1428.5	5515140.	0.4272	143.173	63.347	0.
41								841.6
42		674.0	1365.9		5.9298		4.353	0.0
43		670.5					0.650	1005.0
45		0.	0.	34207.	0.	0.	0.	0.
46	111.2	592.8			5.5382	0.703	4.482	381.7
47							0.678	
48	0.	0.		5032344.		0.	0.	0.
49					1.1309			0.
50				4544164.		0.	0.	0.
51						0.	15.928	0.

		_		_		.m.m.	MP-3 E	-
TL	P	Т	H	Q	SV	SP	PV	
52	211.5	٥.	1417.4	4354230.	3.4608		7.818	
53	209.2	806.4	1428.4	208728.	3.5455	385.592	7.681	0.
54	107.5	622.9	1340.5	4349384.	5.9080	0.	4.266	O.
55	110.8	626.1					0.	
56	107.5		1340.5	3898551	5 9080	333,095	0.	0.
57	16.8						0.657	
			1301.0	1/00.	70.7000	· ·	O (E/I	4777.7
58	16.8	646.4	1227-0	1712.	24. KO21	0.	0.654	4///./
59		622.9	1340.5	3898551.	5.9080	0.	4.266	0.
60	58.7	531.1	1298.6	122229.	9.9384	291.284	2.430	o.
61		0.			9.5024	292.221	2.500	1067.5
62	35.8	426.5			14.6044	260.537	1.565	0.
63	36.2	o.	1238.2	3526673.	14.0353	261.582	1.607	1085.9
64	10.5	242.3					0.513	
65		o.					0.537	
66							0.	
67	107.3	775 0	1190 1	/1101	Д 164Д	o.	^	ŏ.
68	2.0	20010	1070 1	· ·	7.1077	O.	o. o.	0.
69	4.5	700.0	1277-1	750	440 0754	O	V *	Ŏ.
	**3	0/0"7	1.0/2.1	730.	140.0704	٥.	٥.	Ο.
	4.5	0/6.1	13/2./	3171.	148.8/34	0.	0.	٥.
71		0.	1462.1		0.	o.	o.	٥.
72	0.	O.	0.	257.	0.	0.	Q.	0.
73	o.	O.	0.	-3625.	٥.	٥.	0.	0.
75	0.	0.	0.	5728.	0.	0.	o. o. o.	0.
76	0.	0.	0.	875683.	0.	0.	0.	V.
79	964.B	772.4	1374.6	500223.	0. 0.6934	540.251	37.303	0.
80	514.8	606.1	1301.7	480037.	o.	0.	0.	0.
81	16.5	624.4	1346.9	0.	39.0946	0.	0.	0.
82	0.	0.	0.	4544164.	0.	0.	0.	0.
83	107.3	333.0	1188.4	273.	0.	0.	0.	
84	475 0	1006 7	1524 4	4544814	0. 1.7990	7 731	16 749	0. 799.0
86	0.	700012	^	100541	Δ.,,,,	0.	0.	0.
	o.	0.	٥.	7101	O.	٥.	٥.	٥.
90	شد شدشت بری		704 1	3171.	0. 0. 0.0178	0.	0. 0. 0. 3.403	٥.
	13/.3	~~~~ = 1	304.1	O.	0.01/8	0.	ν·	474 7
91	131.7	23/.3	206.1	461000"	0.0164	0.04/	V.	101./
75	1.7	114.2	1036.9	3296859.	190.3695	1045.445	3.403	522.6
99	0.	O.	v.	6/60.	0.	U.	U.	٥.
100	0.	0.	0.	615.	0.	٥.	0.	1879.1
	2679.9			5578025.		1.028		2679.9
106	4.5	0.	1092.4	103201.	78.1635	157.828	0.240	0.
107	4.5	0.	1093.0	3296859.	77.3689	0.	0.242	1124.0
108	1.7	119.5	1045.4	3296859.	205.7008	1045,445	3.403	-3624.8
109	0.	0.	267.1	2150541.	0.	0.	0.	0.
111	107.3	333.1	304.0	6488791.	4.1459	0.	-0.142	٥.
112	0.	0.	1428.5		0.	0.	0.	٥.
113	0.	0.		5498360.	0.		0.115E 19	0.
114	434.6	125.1	94.2		0.0162		0.	434.6
115	434.6	125.1	94.2		0.0162			434.6
116	434.6	125.1	94.2		0.0162			434.6
117	434.6	125.1	94.2	15126.	0.0162			434.6
118	434.6	125.1	94.2					434.6
					0.0162	0.660		
119	434.6	125.1	94.2	22202.	0.0162	0.660	0.	434.6
120	0.	0.		4788.	o.	٥.	O.	٥.
122	0.	0.		4196167.	0.	0.	0.	٥.
123	4.4	131.1	99.1		0.0163	0.	4.700	0.
125	481.8	808.0	1418.3	16144.	1.5086	0.628	0.	469.5
130	0.	0.	0.		0.	0.	0.	0.
131	108.3	622.4	1340.2	105879.	5.8608	1.018	0.	108.3
132	108.5	622.1	1340.1	109621.	5.8481	1.019	0.	108.5
133	0.	٥.	.0.	214886.	0.	0.	0.	0.
201	0.1	0.	1524.4	0.	0.	222.775	0.	0.

 VALVE PDINT
 VWD
 05/14/87
 TEST PDINT
 06

 INTERMOUNTAIN PWR PROJECT
 UNIT #2

 820000. KW
 TC4F-30 IN LSB
 TURBINE NO 270T151

 2400. PSIG
 1000./ 1000. F
 2.300 IN HG ABS

### CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 860755. 859887. HEAT RATE 7847.1 7855.0 THROTTLE FLOW 6224013. 6269949.

#### TURBINE THERMAL PERFORMANCE

		HIGH PR	ESS TB	REHEAT TB			
				IP T	ΓB	LP TB	
		THROTTLE	COLD RHT	INLET	EXH		EXH
	PRESS	2394.20	571.50	527.60	118.60		3.599
	TEMP	996.50	619.30	1002.45	618.80	)	121.56
*	ENTH	1458.75	1305.18	1520.83	1337.76	)	1031.30
	ENTR	1.5320		1.7317	1.7478	3	
	EFF	88.	.016	91.46	4	93.7	775
ABS	CISSA	PHPX/PT=0.23	387	P1STSTG/PT=0.8	3050	VAN=	539.1

### THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

0.5	TOTAL TB ENER	LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	522.03	329.59		
H ELEP	1031.30		1031.30	
H UEEP	1039.33		1039.33	
EFF ELEP	93.77	92.98	93.77	92.98
EFF UEEP	92.24	90.54	92.24	90.54
VAN	539.15		539.15	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A06-1

	TOTAL TB ENERG	BY BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1033.75		1033.75	
H UEEP	1041.79		1041.79	
EFF ELEP	93.31	92.24	93.31	92.24
EFF UEEP	91.77	89.80	91.77	89.80
UAKI	540 55		540 55	

STO		ONE VEL HD	PCT DELTA	FLANS P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1927.30	0.	0.	0.	86.6	0.	6162994.	1003.8
4	1088.87	4.278	1.24	1075.40	157.4	848.2	5561745.	842.9
RH 1	527.60	0.	0.	0.	350.2	0.	5041928.	795.8
8	517.05	0.	0.	0.	350.2	0.	5059875.	814.8
11	234.23	0.822	1.12	231.60	711.2	791.8	4825774.	781.3
15	118.60	0.	0.	0.	807.6	0.	4300146.	1128.2
15	65.42	0.291	1.29	64.58	1414.8	1089.3	4159730.	1063.0
16	39.88	0.190	1.39	39.33	2021.4	1103.3	3877277.	1079.3
18	11.69	0.059	1.45	11.52	6018.0	1081.0	3733837.	1044.3
19	5.01	0.022	1.26	4.94	12096.0	1126.0	3610182.	1118.8

Т	L	PRESS	TEMP	ENTH	FLOW		
		FEEDW	IATER	CYCLE			**
	·				LE	ATER	8
4	FW IN	2733.90	478.80	463.56	6228975.6	CLOSED	G
2	EXTR	1062.60	788.10	1379.22	582439.2	TD =	0.4
3	DRAIN	1062.60	486.00	471.41	582439.2	DC =	7.2
					HE	ATER	7
7	FW IN	2733.90	395.00	372.85	6228975.6	CLOSED	
	EXTR	557.00	618.30	1305.74	552154.5	TD =	-0.5
	DRAIN	557.00	403.70	379.43	1134593.8	DC =	8.7
ن	ENTRY	1062.60	486.00	471.41	582439.2		
					HE	ATER	6
	FW IN	2908.20	345.60	321.66	6228975.6	CLOSED	•
	EXTR	229.90	802.10	1425.33	234100.5	TD =	-1.3
	DRAIN ENTRY	229.90 557.00	353.30 403.70	325.37 379.43	1368694.3 1134593.8	DC =	7.7
0	ENINT	557.00	403.70	3/7.43	1104070.0		,
					P	UMP	
11		0.	0.	0.	6187291.2		
	SEAL INJ	o.	٥.	0.	107115.2		
30 32	SEAL RET	o. o.	0.	0.	65430.7 0.	*,	
	EXTR	1500.00	0. 220.20	0. 191.69	0.		
35	FW OUT	2908.20	345.60	321.66	6228975.6	•	
							_
13	FW IN	127.80	296.10	265.82	HE 4534707.4	ATER OPEN	5
12	EXTR	118.30	619.60	1338.18	284958.8	STO =	769.6
111	DRAIN	118.30	340.40	311.68	7116503.7	SC =	-0.2
109	ENTRY	0.	0.	275.04	2297906.8		
					LIE	ATER	4
17	FW IN	174.50	264.20	233.31	4534707.8		•
	EXTR	63.38	515.80	1290.64	140416.3		0.2
16	DRAIN	63.38	269.00	237.97	140416.3	DC =	4.8
					LIE	ATER	3
20	FW IN	174.50	196.20	164.64	4534707.B		~
18	EXTR	37.94	414.80	1243.90	282452.6	$=$ $\alpha T$	-0.1
19	DRAIN	37.94	205.30	173.48	422868.9	DC =	9.1
16	ENTRY	63.38	269.00	237.97	140416.3		
					HE	ATER	2
23	FW IN	174.50	160.30	128.67	4534707.8		<i>A</i>
	EXTR	11.05	233.90	1162.26	143440.6		1.8
22	DRAIN	11.05	167.90	135.88	566309.5		7.6
19	ENTRY	37.94	205.30	173.48	422868.9		

TI			PRESS	TEMP	ENTH	FLOW	
70	TDV TDV		5.03 2.12	654.10	1361.97 1279.06	4497.0 4497.0 0.	
25 123 2 <b>2</b>	FW IN EXTR DRAIN ENTRY ENTRY		4.83 4.83 11.05	0. 133.00 167.90	1088.93 100.96 135.88	4534707.8 123654.9 694461.4	TD = 0.5
87	LEAKA	GE	o. o.	0.	0.	PI 4641822.9 O. 4641822.9	
						F	W TO BOILER
44	FW IN	l	2733.90	551.60	548.44	6228975.6	S+L = -4963.
			Ţ	URBIN	E EXPA	ANSION	
				0. 996.50		* **	AIN STEAM LINE
						Vi	ALVE STEM LKG
37	LO NO	1	527.80	887.33	1458.75		P/V = 86.356 C = 55.449
38	LO NO	2	0.	0.	0.	SQRT 1987.5	P/V = 18.949 C = 104.887
						6162994.1 56230.2	
						PAI	CKING NO 2
42	LO NO	1	123.45	690.00	1373.33		P/V =.115E 19 C = 0.000
43	LO NO	2	17.08	682.60	1375.18		P/V = 4.750 C = 1028.969
100	LO NO	3	0.	0.	0.		P/V = 0.655 C = 1834.023

A06-4

T		PRESS	TEMP	ENTH	FLOW
		1088.87 1075.40			EXP TO STG 4 5561745.3 582439.2
					PACKING NO 1
46	LO NO 1	122.05	602.40	1329.31	SQRT P/V = 23.609 4686.3 C = 370.502
47	LO NO 2	16.96	582.40	1326.61	SQRT P/V = 4.898 3454.4 C = 829.131
100	LO NO 3	0.	0.	0.	SQRT P/V = 0.682 606.4 C = 1834.023
80	EXH EXTR TO RHT	571.50	619.30	1305.18	EXPAND TO EXHAUST 5591282.1 552154.5 5039127.5
	BEFORE LO	0.08	0.	1521.22	REHEATER 1
	AFTER LO	527.60	1003.10	1521.18	5041928.4 PCTDP = 7.682
					EXPAND TO BOWL 5059874.8 17946.4
	SHELL EXTR	234.23 231.60	o. 803.60	1415.77 1426.04	EXP TO STG 11 4825774.3 234100.5
					PACKING NO 3
57	LO NO 1	16.95	635.50	1352.26	SQRT P/V = 4.719 1904.7 C = 1106.108
58	LO NO 2	16.95	645.70	1357.21	SQRT P/V = 0.664 2102.6 C = 4990.290
100	LO NO 3	O.	O.,	Ο.	SQRT P/V = 0.661 606.4 C = 1834.023
100	LO NO 4	0.	0.	٥.	SQRT P/V = 0. $606.4 C = 1834.023$

TL	PRESS	TEMP	ENTH	FLOW		
56 EXH 55 EXTR			1337.76 1339.27	4300146.2	ID TO EXHAL	JST
59 ENTRY	118.60	618.80	1337.76		'AND TO BOV	NL.
			1278.95 1295.85	4159729.9	TO STG	15
63 SHELL 62 EXTR	3 <b>9.88</b> 39.33		1234.56 1247.42	3877277.3	то ѕтв	16
65 SHELL 64 EXTR			1142.71 1162.06	3733836.7	° TO STG	18
107 SHELL 106 EXTR	5.01 4.94	o. o.		EXF 3610181.8 123654.9	P TO STG	19
TL	PRESS	TEMP	ENTH	FLOW		
108 TB EXH 76 ENTRY 122 DRAIN	1.77 0. 0.	121.56 0. 0.	1039.3263 0. 0.	SHA 3610181.8 LE 1025609.2 4641823.3	IERATOR	1
MEASURED LOA SHAFT 1 KV	AD = 8607 V = 87264		PF = 0.98 FL =4353.0		64.00	1

# PERFORMANCE

7-1	<b>D</b>	- <del></del>			C11	CD	D11	edire live*
1 1	7777 C	EE1 4	5/0 /	4220074	0 0212	25	PV 0.	_4047 O
7	1062.6	700 1	1770 7	500/70	0.0212	EEO AA1	0.401	236.1
	1062.6							
	2733.9	400.0	7/1:4	100007/	0.0200	٥.	7.200	٥.
	557.0	4/0.0	1705.0	02207/0.	0. 1.0E7E	470 97E	0. -0.525	140.0
ر 6		403.7	1303.7	1174504	1.0333	4/0.4/3	-0.323	140.0
	2733.9	403.7 705.0	3/7.4	1134594.	0.0187	٥.	8.700	٥.
	229.9	373.0	3/2.0	02207/0.	7 7007	707 (/^	0. -1.340	400.4
	227.7	264 4	795 /	234101.	0.2072	373.000	7 700	405.4
	2908.2	333.3 705 /	323.4	1000074.	0.0137	0.	7.700	٥.
	0.	ა4 <b>ა.</b> ი	321.7	02207/0.	0.01//	٥.	0.	0.
		/+0./	122C# U	010/271.	V. E 7470	740 105	0. 769.600	770.4
12		617.6	1228.2	284707.	0.3428	340.175	769.600	2/9:4
13		276.1	265.8	4034707.	0.0174	0.	o. o.	. V.
14		275.1	265.7	4534708.	0.01/4	1.014	0.	1/4.5
15		515.8	1270.6	140416.	9.046/	296.309	0.209	219.5
16		269.0	238.0	140416.	0.01/2	o.	4.800	o.
17		264.2	233.3	4534708.	0.	0.	0. -0.128	0.
18		414.8	1243.9	282453.	13.5611	264.072	-0.128	150.7
	37.9	205.3	173.5	422869.	0.0167	0.	9.100	Q.
20		196.2	164.6	4534708.	0.	0.	o. 1.775	0.
	11.1	233.9	1162.3	143441.	37.0078	197.975	1.775	35.9
	11.1	167.9	135.9	566310.	0.0164	0.	7.600	0.
		160.3	128.7	4534708.	O.	0.	0.	0.
24	1500.0	220.2	191.7	0.	0.0167	0.	o. o.495	0.
25	4.8	o.	1088.9	123655.	O.,	160.795	0.495	-160.8
26	222.2	127.6	96.1	4534708.	0.0162	0.	0.	0.
27	0.	0.	0.	4641823.	0.	0.	O.	٥.
28	0.	0.	0.	18500. 46930.	0.	0.	0.	0.
29		0	0.	46930.	0.	Λ	Ο	. 0
	0.	0.	0.	65431.	0.	0.	o. o.	0.
	2920.2	285.0	259.9	0.	0.0171	O.	٥.	0.
	0.	o. o.	٥.	4641823.	0.	0.	0.	
34	O.	0.	0.	-4963.	0.	0.	0.	0.
35	2908.2	345.6	321.7	6228976.	0.0177	0.	0.	٥.
36	2394.2	996.5	1458.8	6224013.	0.3210	1458.752	86.356	0.
37	527.8	887.3	1458.8	2801.	1.4699	0. 0. 1458.752 0.780	18.949	55.4
38	0.	ο.	0.	1988.	0.	0.	0.	104.9
	2394.2	0.		6219224.	0.3210		86.356	0.
	1927.3			6162994.			70.896	0.
	1088.9	0.		5561745.	0.6196			842.9
42	123.4		1373.3	13922.	5.4716	0.779	4.750	0.0
43	17.1	682.6	1375.2	4281.	39.7595	O.	0.655	1029.0
45	0.	0.	0.	38284.	0.	0.	0.	0.
46	122.0	602.4	1329.3	4686.	5.0881	0.703	4.898	370.5
47	17.0	582.4	1326.6	3454.	36.5003	0.	0.682	829.1
48	0.	0.	0.	5600029.	0.	0.	0.	0.
49	571.5	619.3		5591282.	1.0253		23.609	0.
50	571.5	619.3		5039128.	0.	0.	0.	0.
51	517.0	1001.9		5059875.		٥.	17.733	0.

		_						_
							PV	
				4825774.	3.1054	395.673	8.685	781.3
53	231.6	803.6	1426.0	234101.	3.1892	394.297	8.522	0.
54	118.6	618.8	1337.8	4820554.	5.3248	o.	4.719	0.
55	121.6	622.2	1339.3	520408.	5,2086	342,262	0.	٥.
56		618.8					0.	
57		635.5						
			1757 7	1703.	30.4000	O.	0.664	1100.1
58		645.7	1557.2	2103.	28.7611	v.	0.661	4990.3
59		618.8	1337.8	4300146.	5.3249	O	4.719	O.
60							2.682	
61	65.4	0.					2.766	
62	39.3	422.4					1.726	
63	39.9	0.	1234.6	3877277.	12.6280	267.246	1.777	1079.3
64	11.5	233.8					0.570	
65			1142.7	3733837.	33, 1151	201-097	0.594	1044.3
66		633.0					0.	
67		343.1	1101 0	/	7 7047	Ŏ.	Ŏ.	Ŏ.
		270-1	1171:7	V.	0.7707	· · ·	o. o.	٥.
86		480.0	12/7.1		204.2071	v.	o.	v.
69		654.1	1362.0	1533.	131.7884	o.	0.	0
		654.1	1362.0	4497.	131.7884	O.	0.	0.
71	0.	٥.	1458.8	٥.	0.	o.	O	0.
72	0.	0.	0.	770.	0.	0.	0.	0.
73	0.	0.	0.	-6032.	0.	0.	Ο.,	0.
75	0.	0.	0.	5595.	0.	0.	0.	0.
76		0.	٥.	1025609.	0.	٥.	0.	٥.
	1075.4	790.2	1379.9	582439.	0.6275	553.477	41.399	
80	571.5	619.3	1305.2	552155.	0-	0.	0.	
	16.6	633.0	1351.1	0022001	39 1454	ŏ.	0.	Ŏ.
82	0.			5070170	0/11404	o.	ŏ.	0.
83	110 7	7/O 7	1100 1	200	Ŏ.	^.	Ŏ.	· ·
<i> ,,,</i>	rro.c	1007 1	1170.1	500.	0. 1.6120	7 / 00	10.001	0. 795.8
O 1		1003.1	1321.2	3041728.	1.0120	7.002	16.071	/75.8
20	٥.	· ·	U.	10/115.	0.	0.	o.	o.
55	U.	0.	0.	447/.	0.	0.	0. 0. 0. 0. 0. 3.599	0.
40	148.3	340.4	311./	0.	0.0179	0.	0.	0.
91	139.2	232.3	200.9	929212.	0.0169	0.647	0.	139.2
95	1.8	121.6	1031.3	3610182.	179.3530	1039.326	3.599	539.1
//	V/ €	· ·	O.	00/1:	· ·		0.	V.
100	Ο.	0.	0.	606.	0.	0.	0.	1834.0
104	2733.9	551.6	548.4	6248749.	0.0212	1.028	O.	2733.9
106	4.9	0.	1088.9	123655.	71.2111	161.752	0.263	0.
107	5.0	0.	1089.6	3610182.	70.3504	0.	0.267	1118.8
108	1.8	121.6	1039.3	3610182.	195.1488	1039.326	3.599	-6032.3
109	0.	0.		2297907.			0.	0.
111	118.3	340.4	311.7	7116504.	3.7797	0.	-0.205	0.
	0.	0.		56230.		0.	0.	o.
113	0.	o.		6144185.	o.		0.115E 19	0.
	411.8	126.6	95.6	14773.			0.	411.8
115	411.8	126.6	95.6		0.0162			411.8
116	411.8	126.6	95.6					
								411.8
117	411.8	126.6		13189.				411.8
118	411.8	126.6		21372.				411.8
	411.8	126.6	95.6					411.8
120	0.	0.		4788.	0.	0.	0.	0.
122	Ο.	0.		4641823.	0.	0.	0.	٥.
123			101.0	694461.	0.0163	0.	5.400	0.
125	534.8	818.1	1421.6	17946.	1.3659	0.628	0.	521.0
130	0.	0.	0.	254057.	0.	0.	0.	0.
131	119.3	619.2		124258.		1.019	0.	119.3
132	119.3	619.1		129800.			0.	119.3
133	0.	0.	0.			0.	0.	0.
201	0.1	0.	1521.2	0.	0.	216.039	0.	O.,

 VALVE POINT 3RD VL
 05/15/87
 TEST POINT 07

 INTERMOUNTAIN PWR PROJECT
 UNIT #2

 820000. KW
 TC6F-30 IN LSB
 TURBINE NO 270T151

 2400. PSIG
 1000./ 1000. F
 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 775096. 774305. HEAT RATE 7864.3 7872.3 THROTTLE FLOW 5477861. 5561237.

#### TURBINE THERMAL PERFORMANCE

•	HIGH PR	ESS TB	REHEAT TB			
			IP TE	}	i	_P TB
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2388.90	507.00	467.60	106.10		3.513
TEMP	1006.60	607.30	1003.98	621.50	)	120.69
ENTH	1465.64	1303.04	1523.41	1339.91	,	1038.31
ENTR	1.5369		1.7465	1.7619	?	
EFF	86.	. 221	91.796	•	93.7	757
ABSCISSA	PHPX/PT=0.2	122	P1STSTG/PT=0.70	74	VAN=	501.5

THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TO ENER RHT TO	GY BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	517.40	324.96		
H ELEP	1038.31		1038.31	
H UEEP	1047.45		1047.45	
EFF ELEP	93.76	92.81	93.76	92.81
EFF UEEP	91.99	90.00	91.99	90.00
VAN	501.48		501.48	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A07-1

#### T G L PERFORMANCE OF CONDENSING SECTION

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1040.77		1040.77	
H UEEP	1049.89		1049.89	
EFF ELEP	93.28	72.05	<b>93.28</b>	92.05
EFF UEEP	91.52	89.25	91.52	89.25
VAN	502.78		502.78	

#### STAGE FLOW FUNCTION

STO NO		ONE VEL HD	PCT DELTA	FLANE P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1689.80	0.	0.	0.	86.6	0.	5432148.	1006.2
4	962.48	3.391	1.11	751.80	157.4	847.5	4926550.	842.8
RH 1	467.60	0.	0.	0.	350.2	0.	4483722.	800.0
8	458.25	0.	0.	0.	350.2	0.	4490995.	817.6
11	208.21	0.722	1.11	205.90	711.2	791.9	4284397.	781.9
15	106.10	0.	0.	0.	807.6	0.	3841718.	1129.2
15	58.58	0.239	1.18	57.89	1414.8	1090.5	3721658.	1064.9
16	35.72	0.160	1.30	35.26	2021.4	1106.9	3477102.	1083.4
18	10.46	0.049	1.36	10.32	6018.0	1092.0	3353727.	1047.6
19	4.51	0.015	0.95	4.46	12096.0	1125.1	3256836.	1119.8

1		=		n	1.1	Δ	7	jan.	R	6	V	C	ŧ	E
- 1	_	_	_	L)	W	9-6	1		T\	سا	T	سة	1	_

,						ATER	
					5483310.6		
					488974.9		
3	DRAIN	943.10	473.80	457.37	488974.9	DC =	5.9
					LIE	ATER	7
7	EW TN	2669 20	785 BA	3A3 19	5483310.6		
					471082.7		
					960057.6		
					488974.9		•
						ATER	
					5483310.6		
					206598.3		
					1166655.9		6.8
6	ENTRY	495.90	393.70	368.61	960057.6		
					P	UMP	
11	FW IN	0.	0.	O.	5430703.8		
					117579.8		
30	SEAL RET	0.	0.	0.	64973.0		
				0.			
					0.		
35	FW OUT	2754.40	336.30	311.83	5483310.6		
			•		, ,,	A TEP-10	-
4 ***	rest. The	111 00	700 74	ara aa	#E	ATER	2
					4016291.1 248542.4		E1/1 O
					6403041.8		
				265.32			~ a
107		<b>*</b>					
					2100770.7		
					HE	ATER	
17	FW IN	160.10	258.20	227.18	HE 4016291.8	ATER CLOSED	
15	EXTR	56.85	518.00	227.18 1292.30	HE 4016291.8 120060.2	ATER CLOSED TD =	-0.1
15	EXTR	56.85	518.00	227.18 1292.30	HE 4016291.8	ATER CLOSED TD =	-0.1
15	EXTR	56.85	518.00	227.18 1292.30	HE 4016291.8 120060.2 120060.2	ATER CLOSED TD = DC =	-0.1 4.1
15 16	EXTR DRAIN	56.85 56.85	518.00 262.30	227.18 1292.30 231.14	HE 4016291.8 120060.2 120060.2 HE	ATER CLOSED TD = DC =	-0.1
15 16 20	EXTR DRAIN FW IN	56.85 56.85	518.00 262.30 191.30	227.18 1292.30 231.14	HE 4016291.8 120060.2 120060.2 HE 4016291.8	ATER CLOSED TD = DC = ATER CLOSED	-0.1 4.1
15 16 20 18	EXTR DRAIN FW IN EXTR	56.85 56.85 160.10 34.09	518.00 262.30 191.30 416.70	227.18 1292.30 231.14 159.69 1245.33	HE 4016291.8 120060.2 120060.2 HE 4016291.8 244555.9	ATER CLOSED TD = DC = ATER CLOSED	-0.1 4.1 3
15 16 20 18 19	EXTR DRAIN FW IN	56.85 56.85	518.00 262.30 191.30	227.18 1292.30 231.14	HE 4016291.8 120060.2 120060.2 HE 4016291.8	ATER CLOSED TD = DC = ATER CLOSED TD =	-0.1 4.1
15 16 20 18 19	EXTR DRAIN FW IN EXTR DRAIN	56.85 56.85 160.10 34.09 34.09	518.00 262.30 191.30 416.70 199.80	227.18 1292.30 231.14 159.69 1245.33 167.94	HE 4016291.8 120060.2 120060.2 HE 4016291.8 244555.9 364616.1 120060.2	ATER CLOSED TD = DC = ATER CLOSED TD = DC =	-0.1 4.1 3 -0.5 8.5
15 16 20 18 19 16	EXTR DRAIN FW IN EXTR DRAIN ENTRY	56.85 56.85 160.10 34.09 34.09 56.85	518.00 262.30 191.30 416.70 199.80 262.30	227.18 1292.30 231.14 159.69 1245.33 167.94 231.14	HE 4016291.8 120060.2 120060.2 HE 4016291.8 244555.9 364616.1 120060.2	ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	-0.1 4.1 3
15 16 20 18 19 16	EXTR DRAIN FW IN EXTR DRAIN ENTRY	56.85 56.85 160.10 34.09 34.09 56.85	518.00 262.30 191.30 416.70 199.80 262.30	227.18 1292.30 231.14 159.69 1245.33 167.94 231.14	HE 4016291.8 120060.2 120060.2 HE 4016291.8 244555.9 364616.1 120060.2 HE 4016291.8	ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED	-0.1 4.1 3 -0.5 8.5
15 16 20 18 19 16 23 21	EXTR DRAIN FW IN EXTR DRAIN ENTRY FW IN EXTR	56.85 56.85 160.10 34.09 34.09 56.85	518.00 262.30 191.30 416.70 199.80 262.30	227.18 1292.30 231.14 159.69 1245.33 167.94 231.14	HE 4016291.8 120060.2 120060.2  HE 4016291.8 244555.9 364616.1 120060.2  HE 4016291.8 123375.0	ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = TD =	-0.1 4.1 3 -0.5 8.5
15 16 20 18 19 16 23 21 22	EXTR DRAIN FW IN EXTR DRAIN ENTRY	56.85 56.85 160.10 34.09 34.09 56.85	518.00 262.30 191.30 416.70 199.80 262.30	227.18 1292.30 231.14 159.69 1245.33 167.94 231.14	HE 4016291.8 120060.2 120060.2 HE 4016291.8 244555.9 364616.1 120060.2 HE 4016291.8	ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED	-0.1 4.1 3 -0.5 8.5

TL	•			PRESS	TEMP	ENTH	FLOW	
70	TD	V V		4.50 2.08	653.00	1279.07	2751.8 2751.8 0.	ID DEHIER
25 123 22	EXT DRA ENT	R IN RY		4.40 4.40 9.93	0. 132.10 143.30	1090.98 100.06 131.27	4016291.8 96890.9	ATER 1 CLOSED TD = 0.6 DC = 4.5
87	LE	AKA	3E		0.	o. o.	Pl 4133871.6 0. 4133871.6	JMP
							F	N TO BOILER
1	FW	IN		2669.20	539.10	533.32	5483310.6	S+L = -5449.
-7·1	EXI	-p-			URBIN O.			AIN STEAM LINE
							5477861.3	
							V	ALVE STEM LKG
37	LO	NO	1	467.80	896.16	1465.64		P/V = 85.690 C = 55.757
38	LO	NO	2	0.	0.	0.		P/V = 16.701 C = 129.028
40 112	SHE	LL		1689.80 0.	913.65 0.	1430.35 1430.35	5432148.4 40935.1	KP TO STG 1
							PA	CKING NO 2
42	LO	NO	1	110.28	676.00	1367.00		P/V =.115E 19 C = 0.000
43	LO	NO	2	1 <b>6.8</b> 3	674.80	1371.38		P/V = 4.268 C = 1020.512
100	LO	NO	3	0.	0.	0		P/V = 0.648 C = 1847.487

A07-4

TL	PRESS	TEMP	ENTH	FLOW
41 SHELL .79 EXTR				EXP TO STG 4 4926550.2 488974.9
	Ź			PACKING NO 1
46 LO NO 1	109.14	595.80	1326.88	SQRT P/V = 20.980 4430.5 C = 382.760
47 LO NO 2	16.76	575.70	1323.40	SQRT P/V = 4.390 2996.2 C = 820.036
100 LD ND 3	0.	0.	0.	SQRT P/V = 0.676 603.7 C = 1847.487
49 EXH 80 EXTR 50 TO RHT	507.00	607.30	1303.04	EXPAND TO EXHAUST 4952182.0 471082.7 4481099.3
BEFORE LO 37 ENTRY	0.08	٥.	1523.62	REHEATER 1
84 AFTER LO	467.60	1004.30	1523.58	4483722.2 PCTDP = 7.771
51 ENTRY 125 ENTRY		1003.47 804.90		EXPAND TO BOWL 4490995.1 7272.9
52 SHELL 53 EXTR				204598.3
				PACKING NO 3
57 LO NO 1	16.75	633.50	1351.31	SQRT P/V = 4.213 1769.3 C = 1151.765
58 LO NO 2	16.75	645.50	1357.13	SQRT P/V = 0.657 1875.1 C = 4690.857
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.654 603.7 C = 1847.487
100 LO NO 4	0.	0.	0.	SQRT P/V = 0. 603.7 C = 1847.487

TL .	PRESS	TEMP	ENTH	FLOW	
56 EXH 55 EXTR		621.50 624.80	1339.91 1341.40	3841718.	
59 ENTRY	106.10	621.50	1339.91	3841718.	EXPAND TO BOWL
61 SHELL 60 EXTR	58.58 57.89		1281.71 1298.09		
63 SHELL 62 EXTR	35.72 35.26	0. 425.50	1237.13 1249.45		
65 SHELL 64 EXTR	10.46 10.32	o. 242.40	1144.75 1166.52	3353727.2 123375.0	
107 SHELL 106 EXTR	4.51 4.46	o. o.	1092.19 1090.98	3256836.3 96890.9	EXP TO STG 19
TL	PRESS	TEMP	ENTH	FLOW	
108 TB EXH 76 ENTRY 122 DRAIN	1.73 0. 0.	120.49 0. 0.	0.	3254834.3 870800.2 4133871.4	1
					GENERATOR 1 SHAFT 1
MEASURED LOA SHAFT 1 KW			PF = 1.000 FL =4353.0		= 62.00 = 6630.0

#### PERFORMANCE

#### TRUNKLINE OUTPUT

TI	D	- <del>y-</del>			cu	CD	PV	TD
1 1	7440 7	57D 1	E 2 2 2	W 5/107711	0 0200 20	٥٢	0	_5//O T
<u>ت</u> ب	2007.2	779 0	1774 0	//00075	0.0207	577 591	0. -1.579	7777.5
-	943.1 943.1	77Z.G	1376.U	400773.	0.7113	007.021	5.900	200.0
л	740.1	7/0:0	707.T	=400773.	0.0170	Ŏ.	0	Ŏ.
=	405 O	404.7	1707 7	47100T	1 1794	ALL 161	0. -1.739	140 0
							7.800	
っっ	7/0.7	705 C	747 7	5497711	0.0103	0.	7.000	0.
é	2007.2	202.7	1424 0	2005111	7 A105	707 A77	0. -2.268	419 3
Ω Ω	204.4	747 1	314 4	1166656	0.0179	000.002	6.800	717.0
10	2754 4	7 AFF.	314.0	5497711	0.0177	Ŏ.	0.	Ŏ.
							0.	
17	105 B	471 T	1770 0	248542	5 9950	771 <b>0</b> 24	514.900	78 <b>9 4</b>
13							0.	
14	140 1	207.0	250.0	4016292	0.0173	1 014	o.	160.1
							-0.092	
							4.100	
17	140.1	256.2	727 2	4016797	0.01/1	0.	0.	0.
18	34.1	416.7	1245.3	244556	15.1464	257.738	-0.462	159.0
							8.500	
							0.	
21	9.9	237.1	1164.1	123375.	41.4392	192.869	1.569	. 44-2
							7.000	
23	160.1	156.3	124.6	4016292.	0.	o.	0.	o.
24	1500.0	263.7	235.5	0.	0.0170	0.	o.	. 0.
25	4.4	0.	1091-0	96891.	0.	156.876	0.576	-156.9
							0.	
27	0.	0.	0.	4133872.	0.	0.	ο.	0.
28	0.	0.	0.	19570.	0.	0.	0.	0.
29	0.	0.	0.	45403.	0.	O.	Ο.	٥.
30	0.	0.	0.	64973.	0.	0.	o. o.	0.
31	2759.6	304.0	278.8	0.	0.0173	0.	0.	0.
33	0.	0.	0.	4133872.	0.	0.	0.	0.
34	0.	o.	0.	4133872. -5449.	0.	. 0.	0.	0.
35	2754.4	336.3	311.8	5483311.	0.0176	0.	0.	0.
36	2388.9	1006.6	1465.6	5477861.	0.3253	1465.639	o. 85.690	0.
37	467.8	896.2	1465.6	2623.	1.6771	0.780	16.701	55.8
38	0.	0.	0.	2155.	0.	O.	0.	129.0
39	2388.9	0.	1465.6	5473083.	0.3253	0.	85.690	0.
40	1689.8	913.6	1430.3	5432148.	0.4348	143.743	62.337	0.
41	962.5	0.	1376.7	4926550.	0.6978	540.499	37.138	842.8
42	110.3	676.0	1367.0	12268.	6.0554	0.779	4.268	0.0
43	16.8	674.8	1371.4	3751.	40.0738	0.	0.648	1020.5
45	0.	0.	O.,		0.	0.	0.	0.
46	109.1	595.8	1326.9	4430.	5.6634	0.703	4.390	382.8
47	16.8	575.7	1323.4		36.6972	0.	0.676	820.0
48	0.	0.		4960212.	0.	0.	0.	0.
49	507.0	607.3		4952182.	1.1518		20.980	0.
50	507.0			4481099.	0.	0.	0.	٥.
51	458.2	1003.5	1523.4	4490995.	1.8629	0.	15.686	0.

TL P T T H Q SV SP PV TR TS						<u></u> .			
S3   205.9   804.7   1427.7   206598   3.5982   384.249   7.565   0.54   1064.1   621.5   1339.9   3249545   5.9789   0.   4.213   0.   0.   0.   0.   0.   0.   0.   0									
106.1									
55   108.7	53								
55   106.1   621.5   1339.7   3841718   5.9789   332.133   0. 0.657   1151.8     58   16.8   635.5   1351.5   1379.5   39.2178   0. 0.657   1261.5   1339.9   3841718   5.9790   0. 0.654   4690.9     60   57.7   530.0   1298.1   120060   10.0674   290.382   2.398   0.61     52   53   425.5   1249.4   2445556   14.77921   259.722   1.544   0.64     61   52.6   0. 1281.7   3721658   7.6006   271.316   2.470   1064.9     63   35.7   0. 1237.1   3477102   14.1723   260.771   1.588   1083.4     64   10.3   242.4   1166.5   123375   40.1673   1794.702   0.507   0.507   0.65     65   10.5   0. 1144.8   3353727   36.9690   195.817   0.532   1047.6     66   16.5   624.5   1347.9   79795   39.2425   0. 0. 0.   0.     67   40.5   6253.0   1361.5   631.1   47.1380   0. 0.   0.   0.     69   24.5   653.0   1361.5   2752   147.1380   0.   0.   0.   0.     70   4.5   653.0   1361.5   2752   147.1380   0.   0.   0.   0.     71   0.   0.   1465.6   0.   0.   0.   0.   0.   0.     72   0.   0.   0.   1365.5   2752   147.1380   0.   0.   0.   0.     73   0.   0.   0.   0.   6173   0.   0.   0.   0.   0.     75   0.   0.   0.   6173   0.   0.   0.   0.   0.     76   0.   0.   0.   6173   0.   0.   0.   0.   0.     77   951.8   774.8   1376.7   488975   0.7057   538.621   36.724   0.   0.     80   507.0   607.3   1353.0   471083   0.   0.   0.   0.   0.     81   16.5   626.5   1347.9   0.   39.2425   0.   0.   0.   0.     82   0.   0.   0.   0.   0.   471083   0.   0.   0.   0.     83   105.8   331.9   1188.2   2715   0.   0.   0.   0.   0.   0.     84   467.6   1004.3   1523.6   4485722   0.   0.   0.   0.   0.   0.     95   138.8   332.0   303.0   0.   0.   0.   0.   0.   0.	54								
587         16.8         6435.5         1351.3         1749.         38.7884         0.         0.657         1151.8         88         16.8         645.5         1357.1         1875.3         39.2178         0.         0.657         4690.9         0.         64490.9         0.         64490.9         0.         64490.9         0.         644690.9         0.         644690.9         0.         6444290.382         2.398         0.         6450.9         0.         644290.382         2.398         0.         0.         644290.382         2.398         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	55	108.7							
58         16.8         645.5         1337.1         1875.         39.2178         0.         0.654         4690.7           60         57.9         5530.0         1298.1         120060.         10.0674         290.382         2.2388         0.           61         58.4         0.         1281.7         3721458         9.6006         291.316         2.470         1064.9           62         35.7         0.         1237.1         3721458         9.6006         291.316         2.470         1064.9           63         35.7         0.         1247.1         244556.         14.7921         259.722         1.544         0.           64         10.5         262.5         1347.9         7975.         40.1673         194.702         0.507         0.           65         10.5         0.         1421.8         3353.77         36.9690         195.817         0.532         1047.3           67         10.5         2.5         1347.7         9795.8         39.2425         0.         0.         0.         0.           67         4.5         653.0         1361.5         2.515.0         0.         0.         0.         0.         0.	56	106.1	621.5	1339.9	3841718.	5.9789	332.133	o. ·	0.
58         16.8         645.5         1337.1         1875.         39.2178         0.         0.654         4690.7           60         57.9         5530.0         1298.1         120060.         10.0674         290.382         2.2388         0.           61         58.4         0.         1281.7         3721458         9.6006         291.316         2.470         1064.9           62         35.7         0.         1237.1         3721458         9.6006         291.316         2.470         1064.9           63         35.7         0.         1247.1         244556.         14.7921         259.722         1.544         0.           64         10.5         262.5         1347.9         7975.         40.1673         194.702         0.507         0.           65         10.5         0.         1421.8         3353.77         36.9690         195.817         0.532         1047.3           67         10.5         2.5         1347.7         9795.8         39.2425         0.         0.         0.         0.           67         4.5         653.0         1361.5         2.515.0         0.         0.         0.         0.         0.	57	16.8	633.5	1351.3	1769.	38.7886	0.	0.457	1151.8
60         57.9         530.0         1298.1         1200.60.         10.0644         290.382         2.398         0.           61         58.6         0.         1281.7         3721.658         9.6006         291.316         2.470         1064.9           62         35.3         425.5         1249.4         244556.1         14.1723         250.771         1.544         0.           65         10.5         0.         1144.8         335377         36.7690         195.817         0.532         1047.6           66         16.5         625.5         1347.9         7975.         39.2425         0.         0.         0.           67         105.8         334.7         1189.8         0.         4.2198         0.         0.         0.         0.           68         2.1         480.0         1279.1         0.         266.7139         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.									
60         57.9         530.0         1298.1         1200.60.         10.0644         290.382         2.398         0.           61         58.6         0.         1281.7         3721.658         9.6006         291.316         2.470         1064.9           62         35.3         425.5         1249.4         244556.1         14.1723         250.771         1.544         0.           65         10.5         0.         1144.8         335377         36.7690         195.817         0.532         1047.6           66         16.5         625.5         1347.9         7975.         39.2425         0.         0.         0.           67         105.8         334.7         1189.8         0.         4.2198         0.         0.         0.         0.           68         2.1         480.0         1279.1         0.         266.7139         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.									
641         58.6         0.         1281.7         3721658.         9,4006         291.316         2.470         1046.4           62         35.3         425.5         1249.4         244556.         14.7972         259.722         1544         0.           64         10.3         35.7         0.         1237.1         3477102.         14.1723         260.771         1.588         1083.4           65         10.5         0.         1144.8         3353727.         36.9690         195.817         0.552         1047.6           66         16.5         626.5         1347.9         0.         0.         0.         0.           67         105.8         334.7         1189.8         0.         4.2198         0.         0.         0.         0.           68         2.1         480.0         1279.1         0.         266.7139         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         <									
62         35.5         425.5         1249.4         244556.         14.7921         259.722         1.544         0.           63         35.7         0.         1237.1         347102         14.1732         260.771         1.588         1083.4           64         10.3         242.4         1146.5         323375.         40.1673         194.702         0.507         0.           65         16.5         626.5         1347.9         9795.         39.2425         0.         0.         0.           67         105.8         334.7         1189.8         0.         268.7139         0.         0.         0.           69         4.5         653.0         1361.5         631.1         147.1380         0.         0.         0.           70         4.5         653.0         1361.5         2752.1         147.1380         0.         0.         0.         0.           71         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.           71         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.									
64									
64         10.3         242.4         1166.5         123375         40.1673         194.702         0.507         0.532         1047.6           65         10.5         62.5         1347.7         9795         39.2425         0.         0.         0.         0.           67         105.8         334.7         1189.8         0.         4.2198         0.         0.         0.         0.           68         2.1         480.0         1279.1         0.         268.7139         0.         0.         0.         0.           67         4.5         653.0         1361.5         252.1         147.1380         0.         0.         0.         0.           71         0.         0.         1465.6         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.									
65         10.5         0.         1144.8         3353727.         36.9690         195.817         0.532         1047.6           67         105.8         334.7         1189.8         0.         4.2198         0.         0.         0.           68         2.1         480.0         1279.1         0.         268.7139         0.         0.         0.           69         4.5         653.0         1361.5         631.147.1380         0.         0.         0.         0.           70         4.5         653.0         1361.5         2752.147.1380         0.         0.         0.         0.         0.           71         0.         0.         1465.6         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.									
66									
68         2.1         480.0         127.1         0.         248.7137         0.         0.         0.           69         4.5         653.0         1361.5         631.         147.1380         0.         0.         0.           70         4.5         653.0         1361.5         2752.         147.1380         0.         0.         0.         0.           71         0.         0.         1465.6         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.									
68         2.1         480.0         1279.1         0.268.7139         0.0.0         0.0.0           69         4.5         653.0         1361.5         2752.         147.1380         0.0.0         0.0.0           70         4.5         653.0         1361.5         2752.         147.1380         0.0.0         0.0.0           71         0.0         0.1465.6         0.0.0         0.0.0         0.0.0           73         0.0         0.0.0         0.0.0         0.0.0         0.0.0           75         0.0         0.0.0         0.0.0         0.0.0         0.0.0           76         0.0         0.0.0         0.0.0         0.0.0         0.0.0           80         507.0         607.3         1303.0         471083.0         0.0.0         0.0.0           81         16.5         626.5         1347.9         0.39.2425         0.0.0         0.0.0           82         0.0         0.0.0         4481099.0         0.0.0         0.0.0         0.0.0           84         467.6         1004.3         1523.6         4483722.1         1.8255         7.771         16.005         800.0           86         0.0         0.0	47	10=0	774 7	1100 0	7/73.	07:444U	٥.	0.	٥.
69         4.5         653.0         1361.5         2752. 147.1380         0.         0.         0.         0.           71         0.         0.         1361.5         2752. 147.1380         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	0/	100.0	334.7 400.0	1107.0	٥.	7.4.4.70	0.	٥.	٥.
70         4,5         653,0         1361,5         2752,1         147,1380         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
71         9.         9.         1465.6         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <td< td=""><td></td><td></td><td>653.0</td><td>1201.2</td><td>001.</td><td>147.1380</td><td>0.</td><td>٥.</td><td>, 0.</td></td<>			653.0	1201.2	001.	147.1380	0.	٥.	, 0.
73	70	4.5	653.0	1361.5	2/52.	147.1380	0.	0.	0.
73	71	O.	0.	1465.6	0.	0.	O.	0.	0.
75         0.         0.         0.         6173.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	72	0.	0.	0.	515.	0.	0.	٥.	0.
76         0.         0.         B70800.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <t< td=""><td>73</td><td>0.</td><td>٥.</td><td>0.</td><td>-6235.</td><td>O.</td><td>o.</td><td>0.</td><td>٥.</td></t<>	73	0.	٥.	0.	-6235.	O.	o.	0.	٥.
79         951.8         774.8         1376.7         488975.         0.7057         538.621         36.724         0.           80         507.0         607.3         1303.0         471083.         0.         0.         0.         0.           81         16.5         626.5         1347.9         0.         39.2425         0.         0.         0.           82         0.         0.         0.         4481099.         0.         0.         0.         0.           84         467.6         1004.3         1523.6         4483722.         1.8255         7.7771         16.005         800.0         0.           88         0.         0.         0.         2752.         0.         0.         0.         0.           89         0.         0.         0.         2752.         0.         0.         0.         0.           91         130.8         237.5         206.1         972338.         0.0169         0.647         0.         0.         0.           95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5         0.         0.6491.         0.	75	0.	٥.	0.	6173.	0.	0.	0.	0.
80         507.0         607.3         1303.0         471083.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	76	0.	٥.	o.	870800.	O.	0.	0.	0.
81         16.5         626.5         1347.9         0.         39.2425         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	79	951.8	774.8	1376.7	488975.	0,7057	538.621	36.724	0.
81         16.5         626.5         1347.9         0.         39.2425         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	80	507.0	607.3	1303.0	471083.	0.	0.	0.	0.
82         0.         0.         0.         4481099.         0.         0.         0.         0.           84         467.6         1004.3         1523.6         4483722.         1.8255         7.771         16.005         800.0           86         0.         0.         0.         117580.         0.         0.         0.         0.           90         135.8         332.0         303.0         0.         0.0169         0.647         0.         0.           91         150.8         237.5         206.1         972338.         0.0169         0.647         0.         130.8           95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5           99         0.         0.         0.         6641.         0.         0.         0.         1847.5           100         0.         0.         6641.         0.         0.         0.         1847.5           104         2669.2         539.1         533.3         5491047.         0.0209         1.028         0.         2669.2           106         4.5         0.         1091.0         78891. <td>81</td> <td>16.5</td> <td>626.5</td> <td>1347.9</td> <td>0.</td> <td>39.2425</td> <td>0.</td> <td>0.</td> <td>0.</td>	81	16.5	626.5	1347.9	0.	39.2425	0.	0.	0.
83         105.8         331.9         1188.2         271.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	82	0.	0.	0.	4481099.	0.	0.	0.	٥.
84         467.6         1004.3         1523.6         4483722.         1.8255         7.771         16.005         800.0           86         0.         0.         0.         17580.         0.         0.         0.         0.           90         135.8         332.0         303.0         0.         0.0178         0.         0.         0.           91         130.8         237.5         206.1         972338.         0.0167         0.647         0.         130.8           95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5           99         0.         0.         0.         6641.         0.         0.         0.         0.           100         0.         0.         604.         0.         0.         0.         1847.5           104         2467.2         539.1         533.3         5491047.         0.0209         1.028         0.         2669.2           106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1091.0         9									
86         0.         0.         0.         2752.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.		467.6	1004.3	1523.6	4483722.	1.8255	7.771	16.005	800.0
88         0.         0.         0.         2752.         0.         0.         0.         0.           90         135.8         332.0         303.0         0.         0.0178         0.         0.         0.           91         130.8         237.5         206.1         972338.         0.0169         0.647         0.         130.8           95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5           99         0.         0.         0.         6641.         0.         0.         0.         0.         0.           100         0.         0.         6641.         0.         0.         0.         1.847.5         1.         1.028.         0.         2669.2         1.028.         0.         2669.2         1.028.         0.         2669.2         1.028.         0.         2669.2         1.028.         0.         2669.2         1.028.         0.         0.         238.0         0.         1.028.         0.         2669.2         1.028.         1.028.         0.         0.         0.         238.0         0.         0.         0.         0.         0. <t< td=""><td></td><td></td><td></td><td></td><td></td><td>0.</td><td>0.</td><td>٥.</td><td>0.</td></t<>						0.	0.	٥.	0.
90         135.8         332.0         303.0         0.00178         0.0647         0.130.8           91         130.8         237.5         206.1         972338.         0.0169         0.647         0.130.8           95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5           99         0.         0.         0.6641.         0.         0.         0.         0.           100         0.         0.         6044.         0.         0.         0.         2669.2           104         2667.2         539.1         533.3         5491047.         0.0209         1.028         0.         2669.2           106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1092.2         3256836.         199.6378         1047.448         3.513 -6234.9           109         0.         0.         265.3         2138994.         0.         0.         0.         0.           111         105.8         332.0         302.9         6403042.         4.2011         0.         -0		o.	0.	0.	2752.	0.	0.	0.	0.
91         130.8         237.5         206.1         972338.         0.0169         0.647         0.         130.8           95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5           99         0.         0.         0.         604.         0.         0.         0.         0.           100         0.         0.         604.         0.         0.         0.         1847.5           104         2669.2         539.1         533.3         5491047.         0.0209         1.028         0.         2669.2           106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1092.2         3256836.         77.9511         0.         0.240         1119.8           108         1.7         120.7         1047.4         3256836.         17.9511         0.         0.240         1119.8           109         0.         0.         265.3         2138994.         0.         0.         0.         0.           111         105.8         332.0         302.9 <td>90</td> <td>135.8</td> <td>332.0</td> <td>303.0</td> <td>0-</td> <td>0.0178</td> <td>0.</td> <td>0-</td> <td>0.</td>	90	135.8	332.0	303.0	0-	0.0178	0.	0-	0.
95         1.7         120.7         1038.3         3256836.         184.9225         1047.448         3.513         501.5           99         0.         0.         0.         6641.         0.         0.         0.         0.           100         0.         0.         0.         0.         0.         0.         1847.5           104         2669.2         539.1         533.3         5491047.         0.0209         1.028         0.         2669.2           106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1092.2         3256836.         199.6378         1047.448         3.513         -6234.9           109         0.         265.3         2138994.         0.         0.         0.         0.         0.           111         105.8         332.0         302.9         6403042.         4.2011         0.         -0.074         0.           112         0.         0.         1430.3         40935.         0.         0.         0.115E         19           112         0.         0.         0.         1	91	130.B	237.5	206.1	972338	0.0169	0.647	0-	130.B
99         0.         0.         0.         6641.         0.         0.         0.         0.         100         0.         0.         1847.5           104         2669.2         539.1         533.3         5491047.         0.02097         1.028         0.         2669.2           106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1092.2         3256836.         77.9511         0.         0.240         1119.8           108         1.7         120.7         1047.4         3256836.         199.6378         1047.448         3.513 -6234.9           109         0.         0.         265.3         2138994.         0.         0.         0.         0.           111         105.8         332.0         302.9         6403042.         4.2011         0.         -0.074         0.           112         0.         0.         1430.3         40935.         0.         0.         0.115E 19         0.           113         0.         0.         0.         5415525.         0.         0.         0.115E 19         0.         1. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
100         0.         0.         604.         0.         0.         1.028         0.         2669.2           104         2669.2         539.1         533.3         5491047.         0.0209         1.028         0.         2669.2           106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1092.2         3256836.         77.9511         0.         0.240         1119.8           108         1.7         120.7         1047.4         3256836.         199.6378         1047.448         3.513         -6234.9           109         0.         0.         265.3         2138994.         0.         0.         0.         0.         0.           111         105.8         332.0         302.9         6403042.         4.2011         0.         0.         0.         0.           112         0.         0.         1430.3         40935.         0.         0.         0.115E 19         0.           113         0.         0.         0.         5415525.         0.         0.         0.115E 19         0.           114									
104       2669.2       539.1       533.3       5491047.       0.0209       1.028       0.238       0.         106       4.5       0.1091.0       96891.       78.6673       157.485       0.238       0.         107       4.5       0.1092.2       3256836.       77.9511       0.00.       0.240       1119.8         108       1.7       120.7       1047.4       3256836.       199.6378       1047.448       3.513       -6234.9         109       0.0       0.265.3       2138994.       0.0       0.0       0.0       0.0       0.0         111       105.8       332.0       302.9       6403042.       4.2011       0.0       0.0       0.0       0.0         112       0.0       0.1430.3       40935.       0.0       0.0       0.115E 19       0.0         112       0.0       0.1430.3       40935.       0.0       0.0162       0.624       0.0       438.5         115       438.5       126.4       95.5       14848.       0.0162       0.624       0.0       438.5         116       438.5       126.4       95.5       15749.       0.0162       0.660       0.438.5         119 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
106         4.5         0.         1091.0         96891.         78.6673         157.485         0.238         0.           107         4.5         0.         1092.2         3256836.         77.9511         0.         0.240         1119.8           108         1.7         120.7         1047.4         3256836.         199.6378         1047.448         3.513         -6234.9           109         0.         0.         265.3         2138994.         0.         0.         0.         0.         0.           111         105.8         332.0         302.9         6403042.         4.2011         0.         0.         0.         0.           112         0.         0.         1430.3         40935.         0.         0.         0.         0.         0.           113         0.         0.         0.         5415525.         0.         0.         0.115E 19         0.           114         438.5         126.4         95.5         14282.         0.0162         0.624         0.         438.5           115         438.5         126.4         95.5         27472.         0.0162         0.623         0.         438.5									
107       4.5       0.       1092.2       3256836.       77.9511       0.       0.240       1119.8         108       1.7       120.7       1047.4       3256836.       199.6378       1047.448       3.513       -6234.9         109       0.       0.       265.3       2138994.       0.       0.       0.       0.       0.         111       105.8       332.0       302.9       6403042.       4.2011       0.       0.       0.       0.         112       0.       0.       1430.3       40935.       0.       0.       0.       0.         113       0.       0.       0.       5415525.       0.       0.       0.115E 19       0.         114       438.5       126.4       95.5       142848.       0.0162       0.624       0.       438.5         116       438.5       126.4       95.5       27472.       0.0162       0.623       0.       438.5         117       438.5       126.4       95.5       22286.       0.0162       0.660       0.       438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.       438.									
108       1.7       120.7       1047.4       3256836.       199.6378       1047.448       3.513 -6234.9         109       0.       0.       265.3       21389994.       0.       0.       0.       0.         111       105.8       332.0       302.9       6403042.       4.2011       0.       -0.074       0.         112       0.       0.       1430.3       40935.       0.       0.       0.       0.       0.         113       0.       0.       0.       5415525.       0.       0.       0.115E 19       0.         114       438.5       126.4       95.5       14848.       0.0162       0.624       0.       438.5         115       438.5       126.4       95.5       27472.       0.0162       0.623       0.       438.5         116       438.5       126.4       95.5       15749.       0.0162       0.660       0.       438.5         117       438.5       126.4       95.5       22286.       0.0162       0.660       0.       438.5         120       0.       0.       0.       4778.       0.       0.60       0.       438.5         120									
107       0.       0.       265.3       21389794.       0.       0.       0.       0.       0.         111       105.8       332.0       302.9       6403042.       4.2011       0.       -0.074       0.         112       0.       0.       0.       1430.3       40935.       0.       0.       0.       0.         113       0.       0.       0.       5415525.       0.       0.       0.115E 19       0.         114       438.5       126.4       95.5       14848.       0.0162       0.624       0.       438.5         115       438.5       126.4       95.5       14282.       0.0162       0.624       0.       438.5         116       438.5       126.4       95.5       27472.       0.0162       0.623       0.       438.5         117       438.5       126.4       95.5       227472.       0.0162       0.660       0.       438.5         119       438.5       126.4       95.5       22286.       0.0162       0.660       0.       438.5         120       0.       0.       0.       4778.       0.       0.       0.       0.									
111       105.8       332.0       302.9       6403042.       4.2011       0.       -0.074       0.         112       0.       0.       1430.3       40935.       0.       0.       0.       0.         113       0.       0.       0.       5415525.       0.       0.       0.115E 19       0.         114       438.5       126.4       95.5       14282.       0.0162       0.624       0.       438.5         115       438.5       126.4       95.5       27472.       0.0162       0.623       0.       438.5         116       438.5       126.4       95.5       15749.       0.0162       0.660       0.       438.5         117       438.5       126.4       95.5       22286.       0.0162       0.660       0.       438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.       438.5         120       0.       0.       0.       4778.       0.       0.       0.       0.         122       0.       0.       0.       4133871.       0.       0.       0.       0.         125       464.5									
112       0.       0.       1430.3       40935.       0.       0.       0.       0.       0.         113       0.       0.       0.       5415525.       0.       0.       0.115E 19       0.         114       438.5       126.4       95.5       14848.       0.0162       0.624       0.       438.5         115       438.5       126.4       95.5       14282.       0.0162       0.624       0.       438.5         116       438.5       126.4       95.5       27472.       0.0162       0.623       0.       438.5         117       438.5       126.4       95.5       15749.       0.0162       0.660       0.       438.5         118       438.5       126.4       95.5       22286.       0.0162       0.660       0.       438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.       438.5         120       0.       0.       0.       0.60       0.       0.       0.         122       0.       0.       0.       4133871.       0.       0.       0.       0.         125       464.5						6 2011			
113       0.       0.       0.       5415525.       0.       0.       0.115E 19       0.         114       438.5       126.4       95.5       14848.       0.0162       0.624       0.       438.5         115       438.5       126.4       95.5       27472.       0.0162       0.623       0.       438.5         116       438.5       126.4       95.5       15749.       0.0162       0.660       0.       438.5         118       438.5       126.4       95.5       22286.       0.0162       0.660       0.       438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.       438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.       438.5         120       0.       0.       0.4778.       0.       0.660       0.       438.5         120       0.       0.       0.       4778.       0.       0.       0.       0.         122       0.       0.       0.       4133871.       0.       0.       0.       0.         125       464.5       804.9 <td></td> <td></td> <td>332.0</td> <td>1070 7</td> <td>40004Z.</td> <td></td> <td></td> <td></td> <td></td>			332.0	1070 7	40004Z.				
114       438.5       126.4       95.5       14848.       0.0162       0.624       0.438.5         115       438.5       126.4       95.5       14282.       0.0162       0.624       0.438.5         116       438.5       126.4       95.5       27472.       0.0162       0.623       0.438.5         117       438.5       126.4       95.5       15749.       0.0162       0.660       0.438.5         118       438.5       126.4       95.5       22286.       0.0162       0.660       0.438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.438.5         120       0.       0.       0.4778.       0.0660       0.438.5         120       0.       0.       4778.       0.0660       0.660       0.438.5         120       0.       0.       4778.       0.0660       0.0660       0.0660       0.0660         122       0.       0.       0.4778.       0.0660       0.0660       0.0660       0.0660       0.0660         123       4.4       132.1       100.1       587634.       0.0163       0.628       0.628       0.628       0.628<			0.	1400.0	40733.	٥.	٥.		
115       438.5       126.4       95.5       14282.       0.0162       0.624       0.438.5         116       438.5       126.4       95.5       27472.       0.0162       0.623       0.438.5         117       438.5       126.4       95.5       15749.       0.0162       0.660       0.438.5         118       438.5       126.4       95.5       22286.       0.0162       0.660       0.438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.438.5         120       0.0.0.0.0.4778.       0.0.0.660       0.660       0.438.5         120       0.0.0.4133871.       0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.				0.	2413323.	0.0475			
116       438.5       126.4       95.5       27472.       0.0162       0.623       0.438.5         117       438.5       126.4       95.5       15749.       0.0162       0.660       0.438.5         118       438.5       126.4       95.5       22286.       0.0162       0.660       0.438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.438.5         120       0.       0.       0.4778.       0.0660       0.438.5         120       0.       0.       0.0660       0.0660       0.688.5         120       0.       0.       0.0660       0.0660       0.688.5         120       0.       0.       0.0660       0.0660       0.0688.5         122       0.       0.       0.0660       0.0660       0.0688.5         123       4.4       132.1       100.1       587634.       0.0163       0.0628       0.0660         130       0.       0.0660       0.0628       0.0660       0.0660       0.0660         131       106.9       621.2       1339.7       101833.       5.9318       1.018       0.0660         133						0.0162	0.624	0.	
117       438.5       126.4       95.5       15749.       0.0162       0.660       0.438.5         118       438.5       126.4       95.5       22286.       0.0162       0.660       0.438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.438.5         120       0.       0.       0.4778.       0.0.0       0.0.0       0.0.0         122       0.       0.       0.4133871.       0.0.0       0.0.0       0.0.0         123       4.4       132.1       100.1       587634.       0.0163       0.4500       0.0.0         125       464.5       804.9       1417.0       7273.       1.5616       0.628       0.4520         130       0.       0.       0.0.0       0.0.0       0.0.0       0.0.0         131       106.9       621.2       1339.7       101833.       5.9318       1.018       0.106.9         132       107.1       620.9       1339.5       104150.       5.9188       1.019       0.0.0         133       0.       0.       0.       0.       0.       0.							0.624	0.	
118       438.5       126.4       95.5       22286.       0.0162       0.660       0.438.5         119       438.5       126.4       95.5       22944.       0.0162       0.660       0.438.5         120       0.       0.       0.4778.       0.0.       0.0.       0.0.         122       0.       0.       0.4133871.       0.0.       0.0.       0.0.         123       4.4       132.1       100.1       587634.       0.0163       0.4500       0.0.         125       464.5       804.9       1417.0       7273.       1.5616       0.628       0.462.0         130       0.       0.       0.205983.       0.0.       0.0.       0.0.         131       106.9       621.2       1339.7       101833.       5.9318       1.018       0.106.9         132       107.1       620.9       1339.5       104150.       5.9188       1.019       0.107.1         133       0.       0.       0.205379.       0.0.       0.0.       0.0.						0.0162	0.623	0.	
119       438.5       126.4       95.5       22944.       0.0162       0.660       0.438.5         120       0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.							0.660	o.	
120       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       106.9       106.9       1339.5       104150.       5.9188       1.019       0.       107.1       133       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.					22286.	0.0162			
122       0.       0.       4133871.       0.       0.       0.       0.         123       4.4       132.1       100.1       587634.       0.0163       0.       4.500       0.         125       464.5       804.9       1417.0       7273.       1.5616       0.628       0.       462.0         130       0.       0.       0.       0.       0.       0.       0.         131       106.9       621.2       1339.7       101833.       5.9318       1.018       0.       106.9         132       107.1       620.9       1339.5       104150.       5.9188       1.019       0.       107.1         133       0.       0.       0.       205379.       0.       0.       0.       0.			126.4						438.5
122       0.       0.       4133871.       0.       0.       0.       0.         123       4.4       132.1       100.1       587634.       0.0163       0.       4.500       0.         125       464.5       804.9       1417.0       7273.       1.5616       0.628       0.       462.0         130       0.       0.       0.       0.       0.       0.       0.         131       106.9       621.2       1339.7       101833.       5.9318       1.018       0.       106.9         132       107.1       620.9       1339.5       104150.       5.9188       1.019       0.       107.1         133       0.       0.       0.       205379.       0.       0.       0.       0.			0.						0.
125     464.5     804.9     1417.0     7273.     1.5616     0.628     0.462.0       130     0.0.0     0.205983.     0.0.0     0.0.0       131     106.9     621.2     1339.7     101833.     5.9318     1.018     0.106.9       132     107.1     620.9     1339.5     104150.     5.9188     1.019     0.107.1       133     0.0.0     0.205379.     0.0.0     0.0.0     0.0.0			٥.						
130     0.     0.     0.     0.     0.     0.       131     106.9     621.2     1339.7     101833.     5.9318     1.018     0.     106.9       132     107.1     620.9     1339.5     104150.     5.9188     1.019     0.     107.1       133     0.     0.     0.     205379.     0.     0.     0.     0.			132.1						
130     0.     0.     0.     0.     0.     0.       131     106.9     621.2     1339.7     101833.     5.9318     1.018     0.     106.9       132     107.1     620.9     1339.5     104150.     5.9188     1.019     0.     107.1       133     0.     0.     0.     205379.     0.     0.     0.     0.	125	464.5	B04.9	1417.0	7273.	1.5616			462.0
131     106.9     621.2     1339.7     101833.     5.9318     1.018     0.     106.9       132     107.1     620.9     1339.5     104150.     5.9188     1.019     0.     107.1       133     0.     0.     0.     205379.     0.     0.     0.     0.	130	O.	0.	0.	205983.	0.	0.	0.	
132 107.1 620.9 1339.5 104150. 5.9188 1.019 0. 107.1 133 0. 0. 0. 205379. 0. 0. 0. 0.									106.9
133 0. 0. 0. 205379. 0. 0. 0. 0.						5.9188	1.019		
201 0.1 0. 1523.6 0. 0. 220.576 0. 0.			0.	0.		0.	0.		
			0.	1523.6		0.	220.576	0.	0.

VALVE POINT VWO-OP 05/15/87 TEST POINT 08
INTERMOUNTAIN PWR PROJECT UNIT #2
820000. KW TC6F-30 IN LSB TURBINE NO 270T151
2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

#### CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 898356. 898356. HEAT RATE 7772.3 7772.3 THROTTLE FLOW 6496919. 6281950.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	REHEAT TB			
•			IP TB		LP TB	
	THROTTLE	COLD RHT	INLET	EXH		EXH
PRESS	2477.14	590.03	544.47	122.65		3.195
TEMP	988.20	612.10	995.81	612.80	)	117.29
ENTH	1450.32	1299.07	1516.74	1334.47	7	1020.74
ENTR	1.5228	•	1.7255	1.7411	L	
pulse graces graces	87.	. 790	91.714		93.	902
ABSCISSA	PHPX/PT=0.23	382	P1STSTG/PT=0.804	5	VAN=	616.5

#### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY RHT TB	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	528.21	336.94		
H ELEP	1020.74		1020.74	
H UEEP	1028.10		1028.10	
EFF ELEP	93.90	93.11	93.90	93.11
EFF UEEF	92.51	90.93	92.51	90.93
VAN	616.52		616.52	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A08-1

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LF TB
H ELEP	1023.00		1023.00	
H UEEP	1030.39		1030.39	
EFF ELEP	93.48	92.44	93.48	92.44
EFF UEEP	92.07	90.25	92.07	90.25
VAN	618.01		618-01	

#### STAGE FLOW FUNCTION

STE		ONE VEL HD	PCT DELTA	FLANE P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1 4	1992.87 1124.35	O. 4.554	0. 1.28	0. 1110.00	86.6 157.4	0. 850.9	6438694. 5801024.	1007.5 845.5
RH 1	544.47	0.	0.	0.	350.2	0.	5249181.	800.5
8	533.58	0.	0.	0.	350.2	Ο.	5262602.	818.8
11	242.73	0.849	1.12	240.01	711.2	792.4	5019764.	782.2
15	122.65	0.	0.	0.	807.6	O.	4463988.	1128.8
15	67.63	0.311	1.33	66.73	1414.8	1089.7	4315958.	1063.6
16	41.18	0.202	1.42	40.59	2021.4	1104.1	4019545.	1080.1
18	12.09	0.064	1.53	11.91	6018.0	1071.1	3865914.	1044.7
19	5.14	0.028	1.57	5.06	12096.0	1132.1	3724659.	1123.2

F	E	E	D	W	Α	T	E	R	C	Υ	C	L	Ε

		F E E 12 **	P1 1 5 15	U 1 U L L			
					НЕ	ATER	8
4	FW IN	2630.00			6502076.0		
		1098.85			614860.0		1.8
3	DRAIN	1098.85	489.30	475.24	614860.0	DC =	7.6
					HE	ATER	7
7	FW IN	2830.00	397.50	375.61	6502076.0		•
	EXTR	577.10		1299.40			0.3
	DRAIN	577.10	406.70	382.70		DC =	9.2
3	ENTRY	1098.85	489.30	475.24	614860.0		
						V aleccated	,
10	FW IN	3013.10	7/0 50	324.83		ATER	6
	EXTR	238.20			242838.4		-0.8
	DRAIN	238.20	356.50		1442705.1		8.0
	ENTRY	577.10	406.70	382.70	1199866.7	LL -	G. V
0	ENTITY	3//.10	400.70	362.70	1177000.7		
					•	UMP	
	FW IN	0.	o.		6460944.9		
	SEAL INJ	0.	0.	0.	106069.8		
	SEAL RET	o.	0.	0.	64938.7		
	LEAKAGE	0.	0.	0.	0.		
		1500.00		266.73	O.		
35	FW OUT	3013.10	348.50	324.83	6502076.0		
					HE	ATER	5
13	FW IN	131.80	298.00	267.78			
	EXTR	122.35		1334.95		ST0 =	-1024.8
	DRAIN	122.35	342.70	314.09	7355973.9	SC =	0.0
109	ENTRY	0.	0.	280.50	2337734.2		
			•		g_g grow	ATER	4
17	FW IN	167 90	265 90	235. A3	4725859.8		
	EXTR	65.46			148029.7		0.4
	DRAIN	65.46	271.00	240.02	148029.7		5.1
- Tan	and 1 se sates a	Trend trend 20. 1. Tanger	door and the section	Allow 1 Tar Dr. Terrorius	as 1 mm m and a 2		
						ATER	3
	FW IN	167.90	197.70	166.13	4725859.8		
	EXTR	39.21	409.70	1241.24	296412.4		0.1
	DRAIN	39.21	207.00	175.19	444442.1	DC =	9.3
16	ENTRY	65.46	271.00	240.02	148029.7		
					HE	ATER	2
23	FW IN	167.90	160.90	129.25	4725859.8	CLOSED	
	EXTR	11.40	228.90	1159.77	153631.6	TD =	1.8
	DRAIN	11.40	168.70	136.68	598073.7	DC =	7.8
	ENTRY	39.21	207.00	175.19	444442.1		

T	L	PRES	SS TEMP	ENTH	FLOW	·
70	TDV	1.	. 0. .14 644.60 .88 480.00 MU MEAS TO	1279.08	8020.4 8020.4 0.	IN HEHIER
25 123 22	FW IN EXTR DRAIN ENTRY ENTRY	4. 4. 11.	.91 0. .91 130.40 .40 168.70	1086.23 98.36	4725859.8 141255.1 747349.1 598073.7	TD = 0.6 DC = 6.2
87	FW IN LEAKAG FW OUT	E . 0.	O.	Ο.	P 4831929.6 0. 4831929.6	
				-	F	W TO BOILER
1	FW IN	2830.	.00 554.30	551.63	6502076.0	S+L = -5157.
			TURBI	NE EXP	ANSION	
			0. 14 988.20		0.	AIN STEAM LINE
					0. 6496919.1	AIN STEAM LINE
36		E 2477.	14 988.20		0. 6496919.1 V	ALVE STEM LKG P/V = 89.971
36 37	THROTTL	E 2477.	988.20 .67 872.85	1450.32	0. 6496919.1 V SQRT 2863.5 SQRT	ALVE STEM LKG P/V = 89.971
36 37 38	LO NO LO NO SHELL	E 2477.  1 544.  2 0.	988.20 .67 872.85	1450.32 1450.31 0.	0. 6496919.1 V SQRT 2863.5 SQRT 2090.7 E: 6438693.9 53270.9	ALVE STEM LKG  P/V = 89.971  C = 55.065  P/V = 19.687  C = 106.199  XP TO STG 1
36 37 38	LO NO LO NO SHELL	E 2477.  1 544.  2 0.	988.20 67 872.85 0.	1450.32 1450.31 0.	0. 6496919.1 V SQRT 2863.5 SQRT 2090.7	ALVE STEM LKG  P/V = 89.971 C = 55.065  P/V = 19.687 C = 106.199  XP TO STG 1  CKING NO 2
37 38 40 112	LO NO LO NO SHELL EXTR	E 2477.  1 544.  2 0.	988.20 67 872.85 0. 87 926.23	1450.31 0. 1426.61 1426.61	0. 6496919.1 V SQRT 2863.5 SQRT 2090.7 E: 6438693.9 53270.9 PAI	ALVE STEM LKG  P/V = 89.971  C = 55.065  P/V = 19.687  C = 106.199  XP TO STG 1
36 37 38 40 112	LO NO  SHELL EXTR	E 2477.  1 544.  2 0.  1992. 0.	988.20 .67 872.85 0. 87 926.23 0. 70 677.50	1450.31 0. 1426.61 1426.61	0. 6496919.1 V SQRT 2863.5 SQRT 2090.7 E: 6438693.9 53270.9 PAI SQRT 14646.0	ALVE STEM LKG  P/V = 89.971 C = 55.065  P/V = 19.687 C = 106.199  XP TO STG 1  CKING NO 2  P/V = 115E 19

A08-4

T	L		PRESS	TEMP	ENTH	FLOW
	SHELL EXTR					EXP TO STG 4 5801023.6 614860.0
						FACKING NO 1
46	LO NO	] 1	126.30	592.10	1323.82	SQRT P/V = 24.537 5338.4 C = 389.192
47	LO NO	) 2	17.02	571.70	1321.46	SQRT P/V = 5.097 3577.5 C = 826.231
100	LO NO	3	0.	0.	0.	SQRT P/V = 0.488 633.6 C = 1907.083
80	EXH EXTR TO RH		590.03			585006.7
	BEFORE ENTRY		0.08	٥.	1517.05	REHEATER 1
	AFTER		544.47	996.30	1517.01	5249180.9 PCTDP = 7.722
	ENTRY			995.21 802.90		
	SHELL			0. 797.50		EXP TO STG 11 5019763.5 242838.4
						PACKING NO 3
57	LO NO	1	17.00	632.10	1350.61	SQRT P/V = 4.897 2280.0 C = 1165.281
58	LO NO	2	17.00	641.50	1355.17	SQRT P/V = 0.667 2158.7 C = 5133.372
100	LO NO	3	0.	0.	0.	SQRT P/V = 0.665 633.6 C = 1907.083
100	LO NO	4	٥.	Ο.,	0.	SQRT P/V = 0. 633.6 C = 1907.083

TL	FRESS	TEMF	ENTH	FLOW		
54 EXH 55 EXTR			1334.47 1336.09			JST
59 ENTRY	122.65	612.80	1334.47		EXPAND TO BOW	iL
61 SHELL 60 EXTR			1275.97 1292.66	43159 <b>57.</b> E		15
63 SHELL 62 EXTR			1231.68 .1244.52	4019545.4		16
65 SHELL 64 EXTR	12.09 11.91	o. 220.70	1140.38 1155.69		EXP TO STG	18
107 SHELL 106 EXTR	5.14 5.06	o. o.	1086.76 1086.23	3724658.8		19
TL	PRESS	TEMP	ENTH	FLOW		
108 TB EXH 76 ENTRY 122 DRAIN	1.57 0. 0.	117.29 0. 0.	1028.1024 0. 0.	3724658.8 1102826.2 4831930.2	CONDENSER SHAFT LEVL = -4445	1 5.2 1 1
MEASURED LOA SHAFT 1 KW			PF = 1.00 FL =4353.0	0 H2	= 63.00 = 7795.5	*

#### PERFORMANCE

#### TRUNKLINE OUTPUT

TL	P	Т	Н	Q	sv	SP	PV	TR
1	2830.0	554.3	551.6	6502076.	0.0213	0.	0.	-5156.9
	1098.9	779.4	1371.9	614860.	0.6049	556.147	1.847	223.3
3	1098.9	489.3	475.2	614860.	0.0201	0.	7.600	٥.
4	2830.0	481.7	466.B	6502076.	0.	0.	0.	0.
5	577.1	610.9	1299.4	585007.	1.0029	482.036	0.336	128.9
6	577.1	406.7	382.7	1199867.	0.0187	0.	9.200	
7	2830.0	397.5	375.6	6502076.	0.	0.	0.	0.
8	238.2	796.3	1422.0	242838.	3.0800	396.736	-0.764	399.6
9	238.2	356.5	328.7	1442705.	0.0181	0.	8.000	0.
10	3013.1	348.5	324.8	6502076.	0.0177	0.	0.	0.
11	0.	0.	0.	6460945.	0.	0.		0.
12	122.4	613.7	1334.9	291669.	5.1327	342.726	-1024.800	271.0
13	131.8			4725859.			0.	0.
14	167.9	298.0	267.8	4725860.	0.0174	1.014		167.9
15	65.5	510.3	1287.7	148030.	8.7032	298.447	0.447	211.9
16	45.5	271.0	240.0	148030.	0.0172	· O.	5.100	0.
17	167.9	265.9	235.0	4725860.	0.	0.	0.	0.
18		409.7	1241.2	296412.	13.0355	266.047	0.147	143.7
19	39.2			444442.				0.
20				4725860.			0.	
	11.4	228.9	1159.8	153632.	35.5947	199.469	1.769	29.4
	11.4		136.7	598074.	0.0164	0.	7.800	0.
23				4725860.			0.	0.
	1500.0	294.5	266.7	0.	0.0173	0.	0.	0.
	4.9	0.		141255.	0.	161.469	0.569	
	228.4	124.2	92.7	4725860.	0.0162	0.	0.	0.
	0.		0.	4831930.	0.	0.	0.	o.
28		0.	0.	19289.	o.		0.	o.
29		0.		45650.		o.	o.	0.
	0.	0.		64939.		0.	0.	0.
	3027.8			0.			o.	0.
	0.			4831930.		0.	0.	0.
	0.			-5157.			0.	o.
	3013.1			6502076.			0.	0.
		988.2					89.971	٥.
37	544.7	872.9		2864.				
38	o.	0.	o.	2091.	0.	0.	o.	106.2
	2477.1	0.		6491965.	0.3060	0.	89.971	0.
				6438694.				0.
	1124.3	0.		5801024.				
42							4.943	
	17.2	668.6		7531.				
45		0.	0.				0.	0.
46	126.3	592.1		5338.	4.8621	0.703	5.097	
47		571.7	1321.5				0.688	
48	0.	0.		5840874.			0.	0.
49				5831324.				O.
50				5246317.			0.	0.
51				5262602.			18.354	

The									
ST   240.0   797.5   1422.5   24283B   3.0594   377.396   8.857   0.	TI	₽	7	Н	D	SV	SP	PV	TR
ST   240.0   797.5   1422.5   24283B.   3.0594   397.396   8.857   0.		~~~~		1010 E	5010744	7 0007	<b>398 783</b>	9.024	782.2
122.6   612.8   1334.5   5014058   5.1153   0.   4.897   0.		242-1		Land	3017704.	2.4/00/	707 704	0 057	,
55         122.6         612.8         1334.1         550070.         5.0048         344.800         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <td< td=""><td></td><td>240.0</td><td>797.5</td><td>1422.5</td><td>242838.</td><td>3.0074</td><td>37/.370</td><td></td><td></td></td<>		240.0	797.5	1422.5	242838.	3.0074	37/.370		
55         122.6         612.8         1334.1         550070.         5.0048         344.800         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <td< td=""><td>54</td><td>122.6</td><td>612.8</td><td>1334.5</td><td>5014058.</td><td>5.1153</td><td>O.</td><td></td><td></td></td<>	54	122.6	612.8	1334.5	5014058.	5.1153	O.		
57	55	125.8	616.4	1336.1	550070.	5.0048	344.800	0.	0.
57         17.0         6432.1         1350.6         2280.         38.1475         0.         0.667         51533.4           58         17.0         641.2         1334.5         446398.         5.1154         0.         4.897         0.           60         66.7         520.5         1292.7         148050.         8.4500         299.726         2.781         0.           61         67.5         0.         1276.0         4315958.         8.2211         300.687         2.868         1063.6           62         40.6         416.8         1244.5         296412.         12.6751         268.135         1.788         0.           64         11.9         220.7         1155.7         153532.         33.6258         201.590         0.595         0.           65         12.1         0.         1140.4         3865914.         31.9879         202.714         0.615         0.441.           66         16.6         4625.7         1347.5         961.7         38.8599         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.				1334 5	4443988	5-1153	342.911	0	0.
58         17.0         641.5         1355.2         2157.         38.4987         0.         0.655         5133.4           60         66.7         520.5         1272.0         148030.         8.6300         297.726         2.781         0.           61         67.6         0.         1276.0         4315958.         8.2211         300.687         2.868         103.3           63         41.2         0.         1231.7         4019545.         12.4621         268.135         1.788         0.           64         11.7         220.7         1155.7         753525.         33.4528         201.590         0.595         0.           65         12.1         0.         1140.4         3865914.         31.9879         202.714         0.615         1043.           64         16.6         625.7         1347.5         9617.         38.8533         0.         0.         0.         0.         0.         0.           67         109.9         345.6         1195.2         0.         0.         4.1244         0.         0.         0.         0.           67         109.7         340.3         0.         0.         0.         0.         <					77007001	70 1/75	^	0 447	
59         122.6         612.8         1334.5         446598.         5.1154         0.         4.897         0.           60         64.7         520.5         1292.7         148050.         8.6500         299.726         2.788         0.         0.           61         67.6         0.         1276.0         431598.         8.2211         300.687         2.868         1063.1           63         41.2         0.         1231.7         4019545.         12.1492         269.138         1.841         1080.1           64         11.7         220.7         1155.7         153652.         33.4258         201.590         0.595         0.           65         12.1         0.         1140.4         3885914.         31.979         202.1714         0.6174         0.6174         0.6174         0.6144.         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0         0.00.0			632.1	1000.6	2280.	JO.10/J	0.	0.007	1100.0
60 66.7 520.5 1292.7 148030. 8.6500 299.726 2.781 0.6161 67.6 0. 1276.0 4315958 8.2211 300.687 2.868 1063.6 62 40.6 416.8 1244.5 296412. 12.6951 268.135 1.788 0.633 41.2 0. 1231.7 4019585 12.1492 269.138 1.824 1080.1 64 11.9 220.7 1155.7 153632. 33.6258 201.590 0.595 0.65 12.1 0. 1140.4 3865914. 31.9979 202.714 0.615 1044.7 66 16.6 625.7 1347.5 9617. 38.8583 0. 0. 0. 0. 0. 647 109.9 345.6 1195.2 0. 4.1244 0. 0. 0. 0. 0. 68 1.9 480.0 1279.1 0. 297.6007 0. 0. 0. 0. 0. 67 0. 51 644.6 1357.4 1863. 127.8890 0. 0. 0. 0. 0. 70 5.1 644.6 1357.4 1863. 127.8890 0. 0. 0. 0. 0. 70 5.1 644.6 1357.4 8020. 127.8890 0. 0. 0. 0. 0. 71 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0. 0. 72 0. 0. 0. 04445. 0. 0. 0. 0. 0. 0. 73 0. 0. 04445. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 04445. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	58	17.0	641.5	1355.2	2159.	38.4989	O.	0.665	5155.4
60 66.7 520.5 1292.7 148030. 8.6500 299.726 2.781 0.6161 67.6 0. 1276.0 4315958 8.2211 300.687 2.868 1063.6 62 40.6 416.8 1244.5 296412. 12.6951 268.135 1.788 0.633 41.2 0. 1231.7 4019585 12.1492 269.138 1.824 1080.1 64 11.9 220.7 1155.7 153632. 33.6258 201.590 0.595 0.65 12.1 0. 1140.4 3865914. 31.9979 202.714 0.615 1044.7 66 16.6 625.7 1347.5 9617. 38.8583 0. 0. 0. 0. 0. 647 109.9 345.6 1195.2 0. 4.1244 0. 0. 0. 0. 0. 68 1.9 480.0 1279.1 0. 297.6007 0. 0. 0. 0. 0. 67 0. 51 644.6 1357.4 1863. 127.8890 0. 0. 0. 0. 0. 70 5.1 644.6 1357.4 1863. 127.8890 0. 0. 0. 0. 0. 70 5.1 644.6 1357.4 8020. 127.8890 0. 0. 0. 0. 0. 71 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0. 0. 72 0. 0. 0. 04445. 0. 0. 0. 0. 0. 0. 73 0. 0. 04445. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 04445. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	59	122.6	612.8	1334.5	4463988.	5.1154	0.	4.897	0.
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64         41,2         0.         1231,7         4019545.         12.1492         269,138         1.841         1080,1           64         11,9         20,7         1155,7         153632.         33,6288         201,590         0.595         0.           65         12,1         0.         1140,4         3865914.         31,9879         202,714         0.615         1044,7           66         106,6         625,7         1347.5         9617.         38,8583         0.         0.         0.         0.           68         1.7         480.0         1279,1         0.         2977,6007         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.		/7 /	02.0.0	1074 0	/715050	B 2211	300 AB7	2 848	1063.6
64         41,2         0.         1231,7         4019545.         12.1492         269,138         1.841         1080,1           64         11,9         20,7         1155,7         153632.         33,6288         201,590         0.595         0.           65         12,1         0.         1140,4         3865914.         31,9879         202,714         0.615         1044,7           66         106,6         625,7         1347.5         9617.         38,8583         0.         0.         0.         0.           68         1.7         480.0         1279,1         0.         2977,6007         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.		0/.0	O.	12/0.0	4013730.	O.ZZII	0001007		
64         11.9         220.7         1155.7         153632.         33.6258         201.590         0.595         0.615         1044.7           65         12.1         0.1140.4         3865914.         31.9879         202.714         0.615         1044.7           66         16.6         625.7         1347.5         9617.         38.8583         0.0.0         0.0.0           67         109.9         345.6         1195.2         0.41244         0.0.0         0.0.0           68         1.7         480.0         1279.1         0.297.6007         0.0.0         0.0.0           69         5.1         644.6         1357.4         1863.127.8890         0.0.0         0.0.0           70         5.1         644.6         1357.4         1863.127.8890         0.0.0         0.0.0           72         0.0         0.1450.3         0.0.0         0.0.0         0.0.0           73         0.0         0.0.0         1102822.0         0.0.0         0.0.0           75         0.0         0.0.0         1102822.0         0.0.0         0.0.0           79         1110.0         781.4         1372.5         614860.0         0.5995         557.401	, 62	40.6	416.8	1244.5	296412.	12.6751	268.135		
65         12.1         0.         1140.4         3B65914.         31.9879         202.714         0.615         1044.7           66         109.9         345.6         1195.2         0.         4.1244         0.         0.         0.           68         1.9         480.0         1279.1         0.         297.6007         0.         0.         0.           69         5.1         644.6         1357.4         1863.1         127.8890         0.         0.         0.         0.           70         5.1         644.6         1357.4         8020.1         127.8890         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	63	41.2	0.	1231.7					
65         12.1         0.         1140.4         3B65914.         31.9879         202.714         0.615         1044.7           66         109.9         345.6         1195.2         0.         4.1244         0.         0.         0.           68         1.9         480.0         1279.1         0.         297.6007         0.         0.         0.           69         5.1         644.6         1357.4         1863.1         127.8890         0.         0.         0.         0.           70         5.1         644.6         1357.4         8020.1         127.8890         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	64	11.9	220.7	1155.7	153632.	33.6258	201.590	0.595	0.
66 16.6 6 625.7 1347.5 9617. 38.8583 0. 0. 0. 0. 0. 67 1097.9 345.6 1195.2 0. 4.1244 0. 0. 0. 0. 0. 68 1.9 480.0 1279.1 0. 297.6007 0. 0. 0. 0. 0. 69 5.1 644.6 1357.4 1863. 127.8890 0. 0. 0. 0. 0. 70 5.1 644.6 1357.4 8020. 127.8890 0. 0. 0. 0. 0. 71 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0. 0. 72 0. 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0. 0. 0. 73 0. 0. 0. 04445. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 04445. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 0. 5815. 0. 0. 0. 0. 0. 0. 0. 75 0. 0. 0. 1102826. 0. 0. 0. 0. 0. 0. 0. 79 1110.0 781.4 1372.5 614860. 0.5975 557.401 43.031 0. 80 590.0 612.1 1299.1 585007. 0. 0. 0. 0. 0. 0. 0. 0. 81 12.4 625.7 1347.8 0. 5246317. 0. 0. 0. 0. 0. 0. 0. 82 0. 0. 0. 0. 0. 0. 0. 0. 0. 82 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.			^	1140 4	3845914	31 9879			
68 1.9, 480.0 1279.1 0. 24.1244 0. 0. 0. 0. 0. 69   5.1 644.6 1357.4 1863. 127.8890 0. 0. 0. 0. 0.   70 5.1 644.6 1357.4 8020. 127.8890 0. 0. 0. 0.   71 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0.   72 0. 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0.   73 0. 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0.   75 0. 0. 0. 127.8890 0. 0. 0. 0. 0.   76 0. 0. 0. 1450.3 0. 0. 0. 0. 0. 0. 0.   77 1110.0 781.4 1372.5 61486.0 0. 0. 0. 0. 0.   78 1110.0 781.4 1372.5 61486.0 0.5979 557.401 43.031 0.   80 590.0 612.1 1299.1 585007. 0. 0. 0. 0. 0.   81 12.4 625.7 1347.8 0. 5246317. 0. 0. 0. 0. 0.   82 0. 0. 0. 5246317. 0. 0. 0. 0. 0. 0.   83 122.4 342.7 1190.7 313. 0. 0. 0. 0. 0.   84 544.5 996.3 1517.0 5249181. 1.5528 7.722 18.725 800.5   86 0. 0. 0. 106070. 0. 0. 0. 0. 0.   88 0. 0. 0. 106070. 0. 0. 0. 0. 0.   91 141.7 234.1 202.7 895029. 0.0169 0.647 0. 141.7   95 1.6 117.3 1020.7 3724659. 198.7881 1028.102 3.195 616.5   99 0. 0. 0. 6434.0 0. 0. 0. 0. 0.   0. 0. 0.   104 2830.0 554.3 551.6 6514032. 0.0213 1.028 0. 22830.0   104 2830.0 554.3 551.6 6514032. 0.0213 1.028 0. 22830.0   105 0. 0. 0. 1086.2 141255. 69.4398 162.741 0.270 0.   112 0. 0. 122.4 7 314.1 7355974. 0.0179 0. 0. 0. 0. 22830.0   104 400.4 123.1 92.1 14671. 0.0162 0.624 0. 0. 0. 0.   112 0. 0. 1426.6 53271. 0. 0. 0. 0. 0. 0. 0. 0. 0.   112 0. 0. 0. 128.5 2337734. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.		ال به مشداد د د د	> \n/\mu_ \n\p	******	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	70 0E07	~~~~	0	Δ
68         1,9         480.0         1279.1         0.297.6007         0.0.         0.0.         0.0.           69         5.1         644.6         1357.4         1863.         127.8890         0.0.         0.0.         0.0.           71         0.         0.         1450.3         0.0.         0.0.         0.0.         0.0.           72         0.         0.         0.         0.0.         0.0.         0.0.         0.0.           73         0.         0.         0.         0.0.         0.0.         0.0.         0.0.           75         0.         0.         0.         1102226.         0.0.         0.0.         0.0.           79         1110.0         781.4         1372.5         614860.         0.5995         557.401         43.031         0.0.         0.0.           80         590.0         612.1         1299.1         585007.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.         0.0.		10.0	020./	1347.5	701/.	00.0000	٥.	0.	٠.
649         5.1         644.6         1357.4         1863.1         127.8890         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. </td <td>67</td> <td>107.9</td> <td>345.6</td> <td>1195.2</td> <td>0.</td> <td>4.1244</td> <td>O.</td> <td>0.</td> <td>0.</td>	67	107.9	345.6	1195.2	0.	4.1244	O.	0.	0.
649         5.1         644.6         1357.4         1863.1         127.8890         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. </td <td>68</td> <td>1.9</td> <td>480.0</td> <td>1279.1</td> <td>0.</td> <td>297.6007</td> <td>0.</td> <td>0.</td> <td>٥.</td>	68	1.9	480.0	1279.1	0.	297.6007	0.	0.	٥.
70         5.1         644.6         1357.4         8020.         127.8890         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <td>40</td> <td><b>5</b> 1</td> <td>644 6</td> <td>1357.4</td> <td>1863.</td> <td>127.8890</td> <td>0.</td> <td>0.</td> <td>0.</td>	40	<b>5</b> 1	644 6	1357.4	1863.	127.8890	0.	0.	0.
71         0.         0.         1450.3         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0. <td< td=""><td>70</td><td>C 4</td><td>200 E</td><td>1757 /</td><td>0000</td><td>127 0000</td><td>Ŏ.</td><td>^</td><td>0</td></td<>	70	C 4	200 E	1757 /	0000	127 0000	Ŏ.	^	0
75 0. 0. 0. 0. 1102826. 0. 0. 0. 0. 0. 0. 0. 0. 77 1110.0 781.4 1372.5 614860. 0.5975 557.401 43.031 0. 80 590.0 612.1 1299.1 585007. 0. 0. 0. 0. 0. 0. 81 12.4 625.7 1347.8 0. 52.0502 0. 0. 0. 0. 0. 82 0. 0. 0. 0. 0. 0. 0. 0. 83 122.4 342.7 1190.7 313. 0. 0. 0. 0. 0. 0. 0. 84 544.5 996.3 1517.0 5249181. 1.5528 7.722 18.725 800.5 86 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 88 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0177 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0177 0. 0. 0. 0. 0. 0. 91 141.7 234.1 202.7 895029. 0.0169 0.647 0. 141.7 95 1.6 117.3 1020.7 3724659. 198.7881 1028.102 3.195 616.5 99 0. 0. 0. 0. 634. 0. 0. 0. 0. 0. 0. 0. 0. 1907.1 104 2830.0 554.3 551.6 6514032. 0.0213 1.028 0. 2830.0 106 5.1 0. 1086.8 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 2800.5 2337734. 0. 0. 0. 0. 0. 270 0. 111 122.4 342.7 314.1 7355974. 0. 0. 0. 0. 0. 0. 0. 0. 0. 112.2 108 1.6 117.3 1028.1 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 6415884. 0. 0. 0. 0. 0. 0. 0. 0. 0. 113 0. 0. 0. 6415884. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1142.6 53271. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	70	2.1	044.0	130/.4	8020.	12/.0070	· ·	V.	V =
75 0. 0. 0. 0. 1102826. 0. 0. 0. 0. 0. 0. 0. 0. 77 1110.0 781.4 1372.5 614860. 0.5975 557.401 43.031 0. 80 590.0 612.1 1299.1 585007. 0. 0. 0. 0. 0. 0. 81 12.4 625.7 1347.8 0. 52.0502 0. 0. 0. 0. 0. 82 0. 0. 0. 0. 0. 0. 0. 0. 83 122.4 342.7 1190.7 313. 0. 0. 0. 0. 0. 0. 0. 84 544.5 996.3 1517.0 5249181. 1.5528 7.722 18.725 800.5 86 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 88 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0177 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0177 0. 0. 0. 0. 0. 0. 91 141.7 234.1 202.7 895029. 0.0169 0.647 0. 141.7 95 1.6 117.3 1020.7 3724659. 198.7881 1028.102 3.195 616.5 99 0. 0. 0. 0. 634. 0. 0. 0. 0. 0. 0. 0. 0. 1907.1 104 2830.0 554.3 551.6 6514032. 0.0213 1.028 0. 2830.0 106 5.1 0. 1086.8 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 2800.5 2337734. 0. 0. 0. 0. 0. 270 0. 111 122.4 342.7 314.1 7355974. 0. 0. 0. 0. 0. 0. 0. 0. 0. 112.2 108 1.6 117.3 1028.1 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 6415884. 0. 0. 0. 0. 0. 0. 0. 0. 0. 113 0. 0. 0. 6415884. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1142.6 53271. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.			0.	1450.3	O.	0.	o.	O.	0.
75 0. 0. 0. 0. 1102826. 0. 0. 0. 0. 0. 0. 0. 0. 77 1110.0 781.4 1372.5 614860. 0.5975 557.401 43.031 0. 80 590.0 612.1 1299.1 585007. 0. 0. 0. 0. 0. 0. 81 12.4 625.7 1347.8 0. 52.0502 0. 0. 0. 0. 0. 82 0. 0. 0. 0. 0. 0. 0. 0. 83 122.4 342.7 1190.7 313. 0. 0. 0. 0. 0. 0. 0. 84 544.5 996.3 1517.0 5249181. 1.5528 7.722 18.725 800.5 86 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 88 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0177 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0177 0. 0. 0. 0. 0. 0. 91 141.7 234.1 202.7 895029. 0.0169 0.647 0. 141.7 95 1.6 117.3 1020.7 3724659. 198.7881 1028.102 3.195 616.5 99 0. 0. 0. 0. 634. 0. 0. 0. 0. 0. 0. 0. 0. 1907.1 104 2830.0 554.3 551.6 6514032. 0.0213 1.028 0. 2830.0 106 5.1 0. 1086.8 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 2800.5 2337734. 0. 0. 0. 0. 0. 270 0. 111 122.4 342.7 314.1 7355974. 0. 0. 0. 0. 0. 0. 0. 0. 0. 112.2 108 1.6 117.3 1028.1 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 6415884. 0. 0. 0. 0. 0. 0. 0. 0. 0. 113 0. 0. 0. 6415884. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1142.6 53271. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	72	0.	O.	0.	-1025.	0.	O.,	. 0.	٥.
75 0. 0. 0. 0. 1102826. 0. 0. 0. 0. 0. 0. 0. 77 1110.0 781.4 1372.5 614860. 0.5975 557.401 43.031 0. 80 590.0 612.1 1299.1 585007. 0. 0. 0. 0. 0. 0. 81 12.4 625.7 1347.8 0. 52.0502 0. 0. 0. 0. 0. 82 0. 0. 0. 0. 0. 0. 0. 83 122.4 342.7 1190.7 313. 0. 0. 0. 0. 0. 0. 0. 84 544.5 996.3 1517.0 5249181. 1.5528 7.722 18.725 800.5 86 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 88 0. 0. 0. 0. 106070. 0. 0. 0. 0. 0. 0. 0. 90 152.3 342.7 314.1 0. 0.0179 0. 0. 0. 0. 0. 0. 91 141.7 234.1 202.7 895029. 0.0169 0.647 0. 141.7 95 1.6 117.3 1020.7 3724659. 198.7881 1028.102 3.195 616.5 99 0. 0. 0. 0. 634. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1000 0. 0. 0. 634. 0. 0. 0. 0. 0. 2800.0 1064 2830.0 554.3 551.6 6514032. 0.0213 1.028 0. 2830.0 106 5.1 0. 1086.8 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 280.5 2337734. 0. 0. 0. 0. 0. 0. 274 1123.2 108 1.6 117.3 1028.1 3724659. 218.2728 1028.102 3.195 -4445.2 109 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	73	0 -	Ö.	٥.	-4445.	0.	0.	0.	0.
76         0.         0.         1102826.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         <	75	Ď.	Ŏ.	0	5015	0	0	Λ.	0.
79         1110.0         781.4         1372.5         614860.         0.5975         557.401         43.031         0.           80         590.0         612.1         1299.1         585007.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.			V.	· ·	4400004	^*		^	Ŏ.
80         590.0         612.1         1299.1         585007.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	76	0.	Q.	O.	1102826.	U.	U.		
81         12.4         625.7         1347.8         0.         52.0502         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	79	1110.0	781.4	1372.5	614860.	0.5995	557.401	43.031	O.
81         12.4         625.7         1347.8         0.         52.0502         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.	80	590.0	612.1	1299.1	585007.	0.	0.	0.	0.
82         .0.         0.         5246317.         0.         0.         0.         0.           84         544.5         796.3         1517.0         5249181.         1.5528         7.722         18.725         800.5           86         0.         0.         0.         106070.         0.         0.         0.         0.           90         152.3         342.7         314.1         0.         0.0179         0.         0.         0.           91         141.7         234.1         202.7         895029.         0.0169         0.647         0.         141.7           95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           99         0.         0.         0.         6971.         0.         0.         0.         0.           100         0.         0.         644.0         0.         0.         1907.1         1         0.         1086.2         141255.         69.4598         162.741         0.270         0.         1907.1         0.         0.         2830.0         0.         0.         0.274         1123.2         0.         0.	81	12 A	A25.7	1347.8	0.	52,0502	0.	0.	0.
83         122.4         342.7         1190.7         313.         0.         0.         0.         0.         0.         800.5         860.5         7.722         18.725         800.5         800.5         860.0         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         141.7         7.         7.         7.         7.         7.         0.         0.         0.         0.         141.7         7.         0.         0.         0.         141.7         7.         141.7         7.         1.         0.         0.         0.         1.         141.7         7.         1.         0.         0.         0.         1.         141.5         7.         1.         0.         1.         0.         0.		A 32 E "F	WALSE /	101/10	E084717	^	^	^	0
84         544.5         996.3         1517.0         5249181.         1.5528         7.722         18.725         800.5           86         0.         0.         0.         106070.         0.         0.         0.         0.           90         152.3         342.7         314.1         0.         0.0179         0.         0.         0.           91         141.7         234.1         202.7         895029.         0.0169         0.647         0.         0.           95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           99         0.         0.         0.         6971.         0.         0.         0.         0.           100         0.         0.         634.         0.         0.         0.         1907.1           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         372		.0.			JZ40317.	٥.	٥.	V =	O
86         0.         0.         0.         106070.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         141.7         95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5         99         0.         0.         0.         6971.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         1907.1         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         0.         2853.0         0.         0.         0.         2853.0         0.         0.         0.         2853.0 </td <td></td> <td>122.4</td> <td>342.7</td> <td>1190.7</td> <td>313.</td> <td>0.</td> <td></td> <td></td> <td></td>		122.4	342.7	1190.7	313.	0.			
88         0.         0.         0.         8020.         0.         0.         0.         0.           90         152.3         342.7         314.1         0.         0.0179         0.         0.         0.           91         141.7         234.1         202.7         895029.         0.0169         0.647         0.         141.7           95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           97         0.         0.         0.         6971.         0.         0.         0.         0.           100         0.         0.         0.         634.         0.         0.         0.         2830.0           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         218.2728         1028.102         3.195 -44455.2           109         0.         0.         280.5 <t< td=""><td></td><td>544.5</td><td>996.3</td><td>1517.0</td><td>5249181.</td><td>1.5528</td><td>7.722</td><td></td><td></td></t<>		544.5	996.3	1517.0	5249181.	1.5528	7.722		
88         0.         0.         0.         8020.         0.         0.         0.         0.           90         152.3         342.7         314.1         0.         0.0179         0.         0.         0.           91         141.7         234.1         202.7         895029.         0.0169         0.647         0.         141.7           95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           97         0.         0.         0.         6971.         0.         0.         0.         0.           100         0.         0.         0.         634.         0.         0.         0.         2830.0           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         218.2728         1028.102         3.195 -44455.2           109         0.         0.         280.5 <t< td=""><td>86</td><td>0.</td><td>0.</td><td>0.</td><td>106070.</td><td>O.,</td><td>0.</td><td>0.</td><td>0.</td></t<>	86	0.	0.	0.	106070.	O.,	0.	0.	0.
90         152.3         342.7         314.1         0.00179         0.067         0.0179           91         141.7         234.1         202.7         895029.         0.0169         0.647         0.141.7           95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           97         0.         0.         0.         6971.         0.         0.         0.         0.           100         0.         0.         0.         634.         0.         0.         0.         0.           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           104         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.274         1123.2           109         0.         0.         280.5         2337734.			0.	٥	8020.			0.	0.
91         141.7         234.1         202.7         895029.         0.0169         0.647         0.         141.7           95         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           99         0.         0.         0.         6771.         0.         0.         0.         0.           100         0.         0.         0.         634.         0.         0.         0.         1907.1           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.         0.         0.           111         122.4         342.7         314.1         7355974.         0.0179         0.         0.026         0.           112         0. <td></td> <td>4 655 424 424</td> <td>~~ ~~ ~~ ~~</td> <td>714 1</td> <td>0020</td> <td>0.0170</td> <td>0</td> <td>0</td> <td>0</td>		4 655 424 424	~~ ~~ ~~ ~~	714 1	0020	0.0170	0	0	0
75         1.6         117.3         1020.7         3724659.         198.7881         1028.102         3.195         616.5           79         0.         0.         0.         6971.         0.         0.         0.         0.           100         0.         0.         0.         634.         0.         0.         0.         1907.1           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.274         1123.2           109         0.         0.         1426.6         53271.         0.01079         0.         0.026         0.           111         122.4         3		125.2	○4∠·/	314.1	V.	0.01/7	0.	· ·	4 /1 4 ****
99         0.         0.         0.         6971.         0.         0.         0.         1907.1           100         0.         0.         0.         634.         0.         0.         0.         1907.1           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.         0.           111         122.4         342.7         314.1         7355974.         0.0179         0.         0.026         0.           112         0.         0.         1426.6         53271.         0.         0.         0.026         0.           113         0.         0.         0	91	141.7	234.1	202.7	875027.	0.0167			
100         0.         0.         634.         0.         0.         0.         1907.1           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.         0.           111         122.4         342.7         314.1         7355974.         0.0179         0.         0.026         0.           112         0.         0.         1426.6         53271.         0.         0.         0.026         0.           113         0.         0.         0.         6415884.         0.         0.         0.115E 19         0.           114         400.4         123.1         92.1 <td>75</td> <td>1.6</td> <td>117.3</td> <td>1020.7</td> <td>3724659.</td> <td>198.7881</td> <td>1028.102</td> <td>3.195</td> <td>616.5</td>	75	1.6	117.3	1020.7	3724659.	198.7881	1028.102	3.195	616.5
100         0.         0.         634.         0.         0.         0.         1907.1           104         2830.0         554.3         551.6         6514032.         0.0213         1.028         0.         2830.0           106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.         0.           111         122.4         342.7         314.1         7355974.         0.0179         0.         0.026         0.           112         0.         0.         1426.6         53271.         0.         0.         0.115E 19         0.           113         0.         0.         6415884.         0.         0.         0.115E 19         0.           114         400.4         123.1         92.1         13	99	0.	0.	o.	6971.	0.	0.	0.	0.
104       2830.0       554.3       551.6       6514032.       0.0213       1.028       0.270       0.         106       5.1       0.1086.2       141255.       69.4398       162.741       0.270       0.         107       5.1       0.1086.8       3724659.       68.3995       0.0.       0.274       1123.2         108       1.6       117.3       1028.1       3724659.       218.2728       1028.102       3.195 -4445.2         109       0.0.       0.280.5       2337734.       0.0.       0.0.       0.026       0.         111       122.4       342.7       314.1       7355974.       0.0179       0.0.       0.026       0.         112       0.0.       0.1426.6       53271.       0.0.       0.0.       0.026       0.         113       0.0.       0.0.       6415884.       0.0.       0.0115E 19       0.         114       400.4       123.1       92.1       14671.       0.0162       0.624       0.       400.4         115       400.4       123.1       92.1       13570.       0.0162       0.623       0.       400.4         116       400.4       123.1       92.1 <t< td=""><td>100</td><td>0</td><td>0</td><td>0-</td><td>634</td><td>0-</td><td>٥.</td><td>0.</td><td>1907.1</td></t<>	100	0	0	0-	634	0-	٥.	0.	1907.1
106         5.1         0.         1086.2         141255.         69.4398         162.741         0.270         0.           107         5.1         0.         1086.8         3724659.         68.3995         0.         0.274         1123.2           108         1.6         117.3         1028.1         3724659.         218.2728         1028.102         3.195         -4445.2           109         0.         0.         280.5         2337734.         0.         0.         0.         0.         0.           111         122.4         342.7         314.1         7355974.         0.0179         0.         0.026         0.           112         0.         0.         1426.6         53271.         0.         0.         0.         0.           113         0.         0.         0.         6415884.         0.         0.         0.115E 19         0.           114         400.4         123.1         92.1         14671.         0.0162         0.624         0.         400.4           115         400.4         123.1         92.1         27977.         0.0162         0.624         0.         400.4           118         400.4<	400	~~~ ~	FF 7	EE1 4	<u> </u>	0.0213	1 028	0	2830 0
107       5.1       0.       1086.8       3724659.       68.3995       0.       0.274       1123.2         108       1.6       117.3       1028.1       3724659.       218.2728       1028.102       3.195       -4445.2         109       0.       0.       280.5       2337734.       0.       0.       0.       0.       0.         111       122.4       342.7       314.1       7355974.       0.0179       0.       0.026       0.         112       0.       0.       1426.6       53271.       0.       0.       0.       0.         113       0.       0.       0.       6415884.       0.       0.       0.115E 19       0.         114       400.4       123.1       92.1       14671.       0.0162       0.624       0.       400.4         115       400.4       123.1       92.1       13570.       0.0162       0.624       0.       400.4         116       400.4       123.1       92.1       1145.       0.0162       0.623       0.       400.4         118       400.4       123.1       92.1       18617.       0.0162       0.660       0.       400.4	104	2030.0	224.3	UUI.O	QUITVUL.	0.0210	4177774	A 77A	
108       1.6       117.3       1028.1       3724659.       218.2728       1028.102       3.195       -4445.2         109       0.       0.       280.5       2337734.       0.       0.       0.       0.         111       122.4       342.7       314.1       7355974.       0.0179       0.       0.026       0.         112       0.       0.       1426.6       53271.       0.       0.       0.       0.       0.         113       0.       0.       0.       6415884.       0.       0.       0.115E 19       0.         114       400.4       123.1       92.1       14671.       0.0162       0.624       0.       400.4         115       400.4       123.1       92.1       13570.       0.0162       0.624       0.       400.4         116       400.4       123.1       92.1       27977.       0.0162       0.623       0.       400.4         117       400.4       123.1       92.1       1145.       0.0162       0.660       0.       400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.       400.4								0.270	·
109       0.       0.       280.5       2337734.       0.       0.       0.       0.       0.       0.       111       122.4       342.7       314.1       7355974.       0.0179       0.       0.026       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.	107	5.1	0.	1086.8	3724659.	68.3995	O.	0.274	1123.2
109       0.       0.       280.5       2337734.       0.       0.       0.       0.       0.       0.       111       122.4       342.7       314.1       7355974.       0.0179       0.       0.026       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.	108	1.6	117.3	1028.1	3724659.	218.2728	1028.102	3.195	-4445.2
111       122.4       342.7       314.1       7355974.       0.0179       0.0026       0.026         112       0.0       0.1426.6       53271.       0.00.       0.00.       0.00.         113       0.0       0.0       0.415884.       0.00.       0.0115E 19       0.0115E 19         114       400.4       123.1       92.1       14671.       0.0162       0.624       0.040.4         115       400.4       123.1       92.1       13570.       0.0162       0.624       0.040.4         116       400.4       123.1       92.1       27977.       0.0162       0.623       0.040.4         117       400.4       123.1       92.1       11145.       0.0162       0.660       0.400.4         118       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.0       0.0       0.4954.       0.0       0.660       0.600.         122       0.0       0.0       0.4954.       0.0       0.628       0.6200         123       4.9       <	109	0	0.	280.5	2337734.	٥.	٥.	٥.	0.
112       0.       0.       1426.6       53271.       0.       0.       0.       0.       0.       0.       0.       113       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.	444	100 /	707	71/1 1	775507/	0.0179	<u> </u>	0.026	0-
113       0.       0.       6415884.       0.       0.       0.115E 19       0.         114       400.4       123.1       92.1       14671.       0.0162       0.624       0.       400.4         115       400.4       123.1       92.1       13570.       0.0162       0.624       0.       400.4         116       400.4       123.1       92.1       27977.       0.0162       0.623       0.       400.4         117       400.4       123.1       92.1       11145.       0.0162       0.660       0.       400.4         118       400.4       123.1       92.1       18617.       0.0162       0.660       0.       400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.       400.4         120       0.       0.       0.       4954.       0.       0.       0.       0.         122       0.       0.       0.       4831930.       0.       0.       0.       0.         123       4.9       130.4       98.4       747349.       0.0162       0.       6.200       0.         125       545.1       8	111	1221	J42/	~ ~ ~ ~ .	/ ~~~ / ~~ r	0.01//	^.	O. O.	0.
115       400.4       123.1       92.1       13570.       0.0162       0.624       0.400.4         116       400.4       123.1       92.1       27977.       0.0162       0.623       0.400.4         117       400.4       123.1       92.1       11145.       0.0162       0.660       0.400.4         118       400.4       123.1       92.1       20090.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.00.0       0.00.0         122       0.       0.       0.4831930.       0.0.0       0.00.0       0.00.0         123       4.9       130.4       98.4       747349.       0.0162       0.628       0.537.8         130       0.       0.       0.200.0       0.000.0       0.000.0       0.000.0         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.000.0       123.1         132       12	112	O.	v.	1420.0	552/1.	<u>0.</u>	o.	V.	٠.
115       400.4       123.1       92.1       13570.       0.0162       0.624       0.400.4         116       400.4       123.1       92.1       27977.       0.0162       0.623       0.400.4         117       400.4       123.1       92.1       11145.       0.0162       0.660       0.400.4         118       400.4       123.1       92.1       20090.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.00.0       0.00.0         122       0.       0.       0.4831930.       0.0.0       0.00.0       0.00.0         123       4.9       130.4       98.4       747349.       0.0162       0.628       0.537.8         130       0.       0.       0.200.0       0.000.0       0.000.0       0.000.0         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.000.0       123.1         132       12	113	0.	O.	0.	6415884.	0.	Ο.	0.115E 19	O.
115       400.4       123.1       92.1       13570.       0.0162       0.624       0.400.4         116       400.4       123.1       92.1       27977.       0.0162       0.623       0.400.4         117       400.4       123.1       92.1       11145.       0.0162       0.660       0.400.4         118       400.4       123.1       92.1       20090.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.00.0       0.00.0         122       0.       0.       0.4831930.       0.0.0       0.00.0       0.00.0         123       4.9       130.4       98.4       747349.       0.0162       0.628       0.537.8         130       0.       0.       0.200.0       0.000.0       0.000.0       0.000.0         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.000.0       123.1         132       12	114	400.4	123.1	92.1	14671.	0.0162	0.624	0.	400.4
116       400.4       123.1       92.1       27977.       0.0162       0.623       0.400.4         117       400.4       123.1       92.1       11145.       0.0162       0.660       0.400.4         118       400.4       123.1       92.1       20090.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0.       0.660       0.0.0.         122       0.       0.       0.4831930.       0.0.0.0.       0.0.0.0.         123       4.9       130.4       98.4       747349.       0.0162       0.628       0.537.8         130       0.       0.       0.278386.       0.0.0.0.       0.628       0.537.8         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.123.2         132       123.1       613.1       1334.6       144253.       5.0987       1.020       0.123.1	115	400-4	123.1	92.1	13570.	0.0162	0.624	٥.	400.4
117       400.4       123.1       92.1       11145.       0.0162       0.660       0.400.4         118       400.4       123.1       92.1       20090.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.       0.       0.4954.       0.0.0       0.0.0       0.0.0         122       0.       0.       0.4831930.       0.0.0       0.0.0       0.0.0         123       4.9       130.4       98.4       747349.       0.0162       0.628       0.537.8         130       0.       0.       0.278386.       0.0.0       0.628       0.537.8         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.123.2         132       123.1       613.1       1334.6       144253.       5.0987       1.020       0.123.1	441	400 4	4 4 4	00 1	77077	0.0167	0 623	0	400.4
118       400.4       123.1       92.1       20090.       0.0162       0.660       0.400.4         119       400.4       123.1       92.1       18617.       0.0162       0.660       0.400.4         120       0.       0.       0.4954.       0.0.       0.0.       0.0.         122       0.       0.       0.4831930.       0.0.       0.0.       0.0.         123       4.9       130.4       98.4       747349.       0.0162       0.628       0.537.8         130       0.       0.       0.428       0.628       0.537.8         130       0.       0.278386.       0.0.       0.0.       0.0.         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.123.2         132       123.1       613.1       1334.6       144253.       5.0987       1.020       0.123.1	110	400.4	للماشكسا	74.41	<i>dud 7111</i> u	0.0102	0.020	~*	400 A
119     400.4     123.1     92.1     18617.     0.0162     0.660     0.400.4       120     0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	117	400.4	123.1	92.1	11145.	0.0162	0.000	Ų.	400.4
120       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       123.2       131.1       1334.7       134133.       5.0957       1.019       0.       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       <	118	400.4	123.1	72.1	20090.	0.0162	0.660	0.	400.4
120       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       0.       123.2       131.1       1334.7       134133.       5.0957       1.019       0.       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       123.1       <	119	400.4	123.1	92.1	18617.	0.0162	0.660	0.	400.4
122       0.       0.       0.       4831930.       0.       0.       0.       0.       0.         123       4.9       130.4       98.4       747349.       0.0162       0.       6.200       0.         125       545.1       802.9       1412.6       13421.       1.3196       0.628       0.       537.8         130       0.       0.       0.       0.       0.       0.         131       123.2       613.3       1334.7       134133.       5.0959       1.019       0.       123.2         132       123.1       613.1       1334.6       144253.       5.0987       1.020       0.       123.1	120	0	0	0	4054	0-	0.	0.	0.
123     4.9     130.4     98.4     747349.     0.0162     0.     6.200     0.       125     545.1     802.9     1412.6     13421.     1.3196     0.628     0.     537.8       130     0.     0.     0.     278386.     0.     0.     0.     0.       131     123.2     613.3     1334.7     134133.     5.0959     1.019     0.     123.2       132     123.1     613.1     1334.6     144253.     5.0987     1.020     0.     123.1	war.	~ ·	~	~ *	774074	ň.	0	^	Ö
125     545.1     802.9     1412.6     13421.     1.3196     0.628     0.537.8       130     0.     0.     0.     0.     0.     0.       131     123.2     613.3     1334.7     134133.     5.0959     1.019     0.     123.2       132     123.1     613.1     1334.6     144253.     5.0987     1.020     0.     123.1	122	<b>U.</b>		0.	403173U.	V	×-	7 maa	~
130     0.     0.     278386.     0.     0.     0.     0.       131     123.2     613.3     1334.7     134133.     5.0959     1.019     0.     123.2       132     123.1     613.1     1334.6     144253.     5.0987     1.020     0.     123.1	123	4.9	130.4	98.4	747349.	0.0162	o.	6.200	
130     0.     0.     278386.     0.     0.     0.     0.       131     123.2     613.3     1334.7     134133.     5.0959     1.019     0.     123.2       132     123.1     613.1     1334.6     144253.     5.0987     1.020     0.     123.1	125	545.1	802.9	1412.6	13421.	1.3196	0.628	٥.	537.8
132 123.1 613.1 1334.6 144253. 5.0987 1.020 0. 123.1	130	0.	0.	0.	278386.	0.	0.	0.	0.
132 123.1 613.1 1334.6 144253. 5.0987 1.020 0. 123.1	171	123.2	A17 7	1334 7	1 74177	5-0959	1.019	Ö.	123.2
133 0. 0. 1517.0 0. 0. 217.978 0. 0. 0.	101	غاد به الشارك الله المارك الله الله	CAT A	10071/	TOTTOO:	E 0007	1 000	Õ	177 1
133 0. 0. 0. 277752. 0. 0. 0. 0. 0. 0. 201 0.1 0. 1517.0 0. 0. 217.978 0. 0.	132	125.1	015.1	1004.6	144203.	J. 070/	1.020	~	*****
201 0.1 0. 1517.0 0. 0. 217.978 0. 0.	133	O.,	0.	0.	277752.	o.	U	v.	v.
	201	0.1	0.	1517.0	0.	0.	217.978	O.	O.

A08-8

 VALVE FOINT 2ND VL
 05/16/87
 TEST POINT 09

 INTERMOUNTAIN PWR PROJECT
 UNIT #2

 820000. KW
 TC6F-30 IN LSB
 TURBINE NO 270T151

 2400. PSIG
 1000./ 1000. F
 2.300 IN HG ABS

#### CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 599736. 599283. HEAT RATE 7756.9 7762.8 THROTTLE FLOW 3978528. 4035857.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	REHEAT TB				
			IP TB	LP TB			
	THROTTLE	COLD RHT	INLET	EXH	EXH		
PRESS	2393.30	378.40	348.70	79.47	2.063		
TEMP	1008.80	565.50	1000.99	622.10	102.18		
ENTH	1466.95	1288.78	1525.28	1341.89	1028.46		
ENTR	1.5376		1.7795	1.7951			
In the second	81.	. 581	91.669		93.692		
ABSCISSA	PHPX/PT=0.1	581	P1STST6/PT=0.50	55 \	/AN= 613.5		

#### THRU FLOW PERFORMANCE OF CONDENSING SECTION SHAFT NO 1

	TOTAL TB ENE	RGY BALANCE	LP TB ENERG	Y BALANCE LP TB
AE	530.27	338.09	0 54 0 0 2 game	2002 0 0 000
H ELEP	1028.46		1028.46	
H UEEP	1035.99		1035.99	
EFF ELEP	93.69	92.71	93.69	92.71
EFF UEEP	92.27	90.48	92.27	90.48
VAN	613.48		613.48	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A09-1

	TOTAL TB ENERGY	/ BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
H ELEP	1030.38		1030.38	
H UEEP	1037.94		1037.94	
EFF ELEP	93.33	92.14	93.33	92.14
EFF UEEP	91.90	89.90	91.90	89.90
VAN	614.71		614.71	

#### STAGE FLOW FUNCTION

STE		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1212.30	0.	0.	0.	86.6	0.	3940932.	999.9
4	706.41	1.877	0.84	700.50	157.4	831.6	3610828.	828.1
RH 1	348.70	0.	0.	0.	350.2	0.	3319610.	795.6
8	341.73	0.	0.	0.	350.2	o.	3327842.	813.7
11	155.15	0.484	1.00	153.60	711.2	790.4	3182051.	781.6
15	79.47	o.	0.	0.	807.6	0.	2864751.	1126.7
15	43.95	0.152	1.00	43.51	1414.8	1087.8	2781982.	1066.6
16	26.87	0.109	1.18	26.55	2021.4	1105.1	2607188.	1086.5
18	7.83	0.039	1.45	7.71	6018.0	1096.4	2512066.	1054.9
19	3.32	0.019	1.68	J. 26	12096.0	1132.4	2417013.	1122.8

1			n	1.1	Δ :	т	R	_	v	5	1	=
3		_	IJ.	w	H	1	r.	L.,	T	1	L.,	

					HE	ATER	8
4	FW IN	2569.50	439.90	420.64	3982651.3	CLOSED	
2	EXTR	695.60	718.80	1357.14	317220.6	TD =	-4.1
3	DRAIN	695.60	444.20	423.90	317220.6	DC =	4.3
		**					
					HE	ATER	7
7	FW IN	2569.50	363.90	340.05	3982651.3	CLOSED	
5	EXTR	370.50	564.60	1289.18	311995.5	TD =	-2.7
	DRAIN	370.50	369.70	342.87	629216.1		5.8
	ENTRY	695.60	444.20	423.90	317220.6		
					HE	ATER	6
10	FW IN	2698.50	315.30	290.23	3982651.3	CLOSED	
	EXTR	153.20	801.90	1428.42	145791.1		-3.8
	DRAIN	153.20	320.50	291.03	775007.2		5.2
	ENTRY	370.50	369.70	342.87	629216.1		
					F	UMP	
11	FW IN	0.	0.	0.	3953704.5		
86	SEAL INJ	o.	0.	o.	87343.2		
	SEAL RET	o.	0.	0.	58396.4		
32	LEAKAGE	o.	o.	o.	0.		
	EXTR	1500.00	223.68	175.18	0.		
alies T	tomo d'A S S V	***********		de d'hed 18 de hed	V 1		
국트	EM OUT	2A98 50	715 TO	290 23	<b>マロロウムち1 マ</b>	•	
35	FW OUT	2698.50	315.30	290.23	3982651.3		
35	FW OUT	2698.50	315.30	290.23			5
					HE	ATER	5
13	FW IN	87.85	271.80	240.88	HE 2999607.5	ATER OPEN	
13 12	FW IN EXTR	87.85 78.92	271.80 619.20	240.88 1340.49	HE 2999607.5 179814.5	ATER OPEN STO =	522.8
13 12 111	FW IN EXTR DRAIN	87.85 78.92 78.92	271.80 619.20 311.50	240.88 1340.49 281.59	HE 2999607.5 179814.5 5117596.3	ATER OPEN STO =	
13 12 111	FW IN EXTR	87.85 78.92	271.80 619.20	240.88 1340.49	HE 2999607.5 179814.5	ATER OPEN STO =	522.8
13 12 111	FW IN EXTR DRAIN	87.85 78.92 78.92	271.80 619.20 311.50	240.88 1340.49 281.59	HE 2999607.5 179814.5 5117596.3 1938899.0	ATER OPEN STO = SC =	522.8 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0.	271.80 619.20 311.50 0.	240.88 1340.49 281.59 246.49	HE 2999607.5 179814.5 5117596.3 1938899.0	ATER OPEN STO = SC =	522.8
13 12 111 109	FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0.	271.80 619.20 311.50 0.	240.88 1340.49 281.59 246.49	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7	ATER OPEN STO = SC = ATER CLOSED	522.8 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY FW IN EXTR	87.85 78.92 78.92 0. 130.60 42.80	271.80 619.20 311.50 0. 242.50 516.00	240.88 1340.49 281.59 246.49 211.20 1292.55	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7 82769.1	ATER OPEN STO = SC = ATER CLOSED TD =	522.8 -0.4 4 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0.	271.80 619.20 311.50 0.	240.88 1340.49 281.59 246.49	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7	ATER OPEN STO = SC = ATER CLOSED	522.8 -0.4
13 12 111 109	FW IN EXTR DRAIN ENTRY FW IN EXTR	87.85 78.92 78.92 0. 130.60 42.80	271.80 619.20 311.50 0. 242.50 516.00	240.88 1340.49 281.59 246.49 211.20 1292.55	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7 82769.1 82769.1	ATER OPEN STO = SC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7 82769.1 82769.1 HE	ATER OPEN STO = SC =  ATER CLOSED TD = DC = ATER	522.8 -0.4 4 -0.4
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0 HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED	522.8 -0.4 4 -0.4 3.0
13 12 111 109 17 15 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR	87.85 78.92 78.92 0. 130.60 42.80 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD =	522.8 -0.4 4 -0.4 3.0 3
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3
13 12 111 109 17 15 16 20 18 19	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1  HE 2999607.7 174793.3 257562.4 82769.1	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN  EXTR DRAIN	87.85 78.92 78.92 0. 130.60 42.80 42.80 130.60 25.59 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1 HE	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER ATER	522.8 -0.4 4 -0.4 3.0 3
13 12 111 109 17 15 16 20 18 19 16	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN  FW IN EXTR DRAIN  EXTR DRAIN  ENTRY	87.85 78.92 78.92 0. 130.60 42.80 42.80 42.80 130.60 25.59 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1 HE 2999607.7 174793.3 257562.4 82769.1  HE 2999607.7	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = CLOSED	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16 23 21	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN EXTR	87.85 78.92 78.92 0. 130.60 42.80 42.80 42.80 130.60 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1  HE 2999607.7 174793.3 257562.4 82769.1  HE 2999607.7 75122.8	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1
13 12 111 109 17 15 16 20 18 19 16 23 21 22	FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN  FW IN EXTR DRAIN ENTRY  FW IN EXTR DRAIN ENTRY	87.85 78.92 78.92 0. 130.60 42.80 42.80 42.80 130.60 25.59 42.80	271.80 619.20 311.50 0. 242.50 516.00 245.50 177.50 416.30 184.60 245.50	240.88 1340.49 281.59 246.49 211.20 1292.55 214.06 145.78 1246.24 152.65 214.06	HE 2999607.5 179814.5 5117596.3 1938899.0  HE 2999607.7 82769.1 82769.1  HE 2999607.7 174793.3 257562.4 82769.1  HE 2999607.7 17422.8 352685.2	ATER OPEN STO = SC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =  ATER CLOSED TD = DC =	522.8 -0.4 4 -0.4 3.0 3 -1.1 7.1

T	L			PRESS	TEMP	ENTH	FLOW	
70	TI TI	DV DV		3.23 1.26	462.70	1270.82 1279.14	1436.1 1436.1 0.	
25 123	EXT DRA	IN TR AIN TRY		3.16 3.16	113.50	1093.76 81.48	2999607.7 95052.7	TD = 0.5 DC = 3.2
87	LE	EAKA	GE IT	o. o.		0.	3086951.0 0. 3086951.0	
							F	W TO BOILER
1	F	W IN	l	2569.50	504.50	494.97	3982651.3	S+L = -4124.
				T	URBIN	E E X P A	NSION	
					0. 1008.80		0. 3978527.8	AIN STEAM LINE
								ALVE STEM LKG
37	LO	NO	1	348.90	890.69	1466.95		P/V = 85.758 C = 55.815
38	LO	NO	2	0.	0.	0.	SQRT 2524.6	P/V = 12.437 C = 202.994
							3940931.7 32809.6	
								CKING NO 2 P/V = .115E 19
42	LO	NO	1	82.75	648.00	1354.59		C = 0.000
43	LO	NO	2	15.38	638.80	1353.96		P/V = 3.238 C = 1072.812
100	LO	NO	3	0.	0.	٥.		P/V = 0.602 C = 1839.689

TL	PRESS	TEMP	ENTH	FLOW
41 SHELL 79 EXTR	706.41 700.50	0. 720.60		EXP TO STG 4 3610828.5 317220.6
			-	PACKING NO 1
46 LO NO 1	81.86	562.40	1312.19	SQRT P/V = 15.879 3333.5 C = 381.776
47 LO NO 2	15.33	542.60	1307.63	SQRT P/V = 3.341 2178.3 C = 816.661
100 LO NO 3	0.	· 0.	٥.	SQRT P/V = 0.628 550.4 C = 1839.689
49 EXH 80 EXTR 50 TD RHT	378.40 378.40 378.40			EXPAND TO EXHAUST 3629343.8 311995.5 3317348.3
BEFORE LO 37 ENTRY	0.08	0.	1525.64	REHEATER 1
84 AFTER LO	348.70	1001.60	1525.60	3319610.3 PCTDP = 7.849
51 ENTRY 125 ENTRY	341.73 349.70	1000.61 754.00	1525.28 1395.11	EXPAND TO BOWL 3327842.3 8232.0
52 SHELL 53 EXTR				EXP TO STG 11 3182051.3 145791.1 PACKING NO 3
57 LO NO 1	15.33	630.20	1349.79	SQRT P/V = 3.148
58 LO NO 2	15.33	644.40	1356.68	SQRT P/V = 0.602 1392.4 C = 4139.534
100 LO NO 3	0.	0.	٥.	SQRT P/V = 0.598 550.4 C = 1839.689
100 LD ND 4	0.	0.	0.	SQRT P/V = 0. 550.4 C = 1839.689

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TI	···	PRESS	TEMP	ENTH	FLOW	
					E	XPAND TO EXHAUST
		79.47 81.53		1341.89 1342.95	313546.2	2
59	ENTRY	79.47	622.10	1341.89		EXPAND TO BOWL
	SHELL EXTR			1284.38 1299.87	2781981.	
63 62	SHELL EXTR	26.87 26.55	0. 426.60	1239.88 1251.06	2607188.3 174793.3	EXP TO STG 16
	SHELL EXTR	7.83 7.71	0. 244.20	1146.72 1168.17		
	SHELL EXTR	3.32 3.26	o. o.	1093.63 1093.76		
76 22	TB EXH ENTRY ENTRY DRAIN	1.01 0. 7.34 0.	0.		2417012.8 312405.1 352685.2 3086951.3	2
		·				GENERATOR 1 SHAFT 1
	SURED LOAD FT 1 KW			PF = 0.996 FL =4353.0		= 63.00 = 5338.8

#### PERFORMANCE

#### TRUNKLINE OUTPUT

77.1	<b>D</b>	<del></del>	1.1	О	CU	(mm)	DU	TO
1 1	2540 E	E04 E	105 0	2002/E1	0 0202	or or	PV 0. -4.121	_/107 E
i.	2007.U	710.0	470.0	370Z031.	0.0202	500 770	6_101	714.7
£.	675.6	710.0	1007.1	31/221.	0.7333	002.3/7	4 300	Z10.4
	2569.5	444.2	423.7	31/221.	0.0173	0.	4.300 0. -2.734	0.
	370.5	437.7	420.6	3782631.	V.	O	0.	197 4
		304.0	1207.2	311770.	7 - 7770	43/.100	-Z./34 E 000	12/.4
	370.5	367./	342.7	7000/51	0.0182	0.	5.800	٥.
	2569.5		340.1	376Z631.	0.	V.	0. -3.802	,
	153.2	801.9	1428.4	145/71.	4.8453	360.07B	-3.802	441.5
	153.2	320.5	291.0	//500/.	0.01//	U.	5.200	0.
10	2698.5	315.3	290.2	3982651.	0.0174	0.	o.	0.
11	O	0.	0.	3953704.	0.	0.	o. 522.800	0-
12	78.9	619.2	1340.5	179814.	8.0518	311.102	522.800	308.1
13	87.9	271.8	240.9	2999608.	0.0172	0.	0.	O.
14	130.6	271.8	241.0	2999608.	0.0172	1.014	o. o.	130.6
15	42.8	516.0	1292.5	82769.	13.4585	271.362	-0.438	244.6
16	42.8	245.5	214.1	82769.	0.0170	0.	3.000	0.
17	130.6	242.5	211.2	2999608.	٥.	ο.	0. -1.134	٥.
18	25.6	416.3	1246.2	174793.	20.2241	241.366	-1.134	174.9
19	25.6	184.6	152.7	257562.	0.0165	0.	7.100	٥.
20	130.6	177.5	145.8	2999608.	0.	0.	0.	٥.
21	7.3	237.2	1165.0	95123.	56.2127	178.945	1.445	58.3
22	7.3	165.0	133.0	352685.	0.0164	0.	0. 1.445 21.900	0.
23	130.6	145.1	111.4	2777608.	U.	U.	U.	O.
24	1500.0	223.7	195.2	0.	0.0167	0.	0.	٥.
25	3.2	0.	1093.8	95053.	0.	143.570	0. 0.470	-143.6
26	169.2	110.3	78.7	2999608.	0.0162	0.	٥.	0.
27	0.	0.	0.	3086951.	0.	0.	o. o.	0.
28		0.	0.	17687.	0.	0.	0.	0.
~ ~	^	0.	0.	40709.	0.	0.	0.	0.
30	0.	0.	0.	58396.	0.	0.	0.	0.
31	2697.9	302.6	277.3	0.	0.0173	0.	0. 0. 0. 0. 0. 85.758 12.437	0.
33	0.	0.	0.	3086951.	0.	· O.	0.	0.
34	0.	0.	0.	-4124.	0.	0.	0.	O.,
35	2698.5	315.3	290.2	3982651.	0.0174	O.,	0.	0.
36	2393.3	1008.8	1466.9	3978528.	0.3254	1466.949	85.758	0.
37	348.9	890.7	1467.0	2262.	2.2557	0.780	12.437	55.8
38	0.	0.	0.	2525.	0.	0.	0.	203.0
	2393.3	0.		3973741.	0.3254	O.,	85.758	0.
	1212.3			3940932.	0.5852	134.812	45.514	0.
41	706.4	0.		3610828.	0.9205		27.703	828.1
42	82.7	648.0	1354.6		7.8901		3.238	0.0
43	15.4	638.8	1354.0		42.4579	0.	0.602	1072.8
45	0.	0.	0.	24578.	0.	0.	0.	٥.
46	81.9	562.4	1312.2	3333.	7.3319	0.704	3.341	381.8
47	15.3	542.6		2178.	38.8341	0.	0.628	816.7
48	0.	0.	0.		0.	o.	0.	0.
49	378.4	565.5		3629344.	1.5007	439.200	15.879	o.
50	378.4	565.5		3317348.	0.	0.	0.	0.
51	341.7	1000.6		3327842.	2.5069	o.	11.678	0.
ngani 400					manufacture of the American A		— · <del>-</del>	

	P.	T	Н	Q	SV	SP	PV	TR
52	155.1	O.	1420.4	3182051.	4.7345	361.563	5.725	781.6
53	153.6	804.2	1429.6	145791.	4.8417	360.305	5.632	0.
54	79.5	622.1	1341.9	3178297.	8.0179		3.148	
55		624.5	1343.0	313546-	7-8311	313.353	0.	0.
56							o.	
57							0.602	
58	15.3						0.598	
59							3.148	
60	43.5	531.2	1299.9	82769.	13.4503	272.370	1.799	0.
61	43.9	o.	1284.4	2781982.	12.9301	273.346	1.844	1066.6
62	26.5	426.6	1251.1	174793.	19.7239	243.420	1.160	0.
63					19.0663		1.187	
					54.0014		0.378	
							0.396	1054.9
44	15 1	Z17 0	1770*/	0011	10 1105	**************************************	0.570	1004.7
47	10 0	714 0	11041.0	0044.	TZ:1170	O.	0.	٥.
	78.9		1104.4	V.	J.JO//	٥.	0.	0.
68	1.3	480.0	12/9.1	0.	443.4005	O.	0.	0.
69	3.2	462./	1270.8	0.	169.7525	O	o. o.	0.
70	3.2	462.7	1270.8	1436.	169.7525	0.	0.	0.
71	4 () "	Ο.	1466.9	0.	0.	0.	0.	٥.
72	0.	0.	0.	523.	0.	0.	0.	0.
73	0.	0.	0.	-4848.	0.	·O.	o. o.	0.
75	0.	0-	0.	5542.	0.	0.	0.	0
		Ŏ.	o.	312405	0		o.	
79	700.5	ማማለ ፈ	1757 0	717771	0. 0.0007	EAT 141	27.470	0.
80			1000 0	711000	0:7200	000.101	2/: 4/0	0.
			1207.0	311773.	V.	٥.	0.	0.
81	19.1	013.2	1041.0	V.	42.0716	O.	o.	0.
82	V.	0.	0.	331/348.	0.	o.	o.	0.
83	78.9	311.1	1182.8	202.	O	O.,	0.	0.
84	348.7	1001.6	1525.6	3319610.	2.4566	7.849		795.6
86	Q.	O.	0.	87343.	0.	ο.	o.	0.
88	0.	o.	O.	1436.	O.	O.	0.	0.
90	108.9	311.5	281.6	0.	0.0176	0.	0.	0.
91	114.1	248.1	216.8	1163892.	0.0170	0.647	0.	114.1
75	1.0	102.2	1028.5	2417013.	304.8236	1035.986	2.063	613.5
99		O.				0.		
100	0.	0.	0.	550.	0.	0.	0.	1839.7
	2569.5				0.0202			
106	3.3	0.	1093.8		106.4798			
107	3.3	o.			104.7646			
108	1.0	102.2			329.4876			
				1938899.			0.	0.
111		744 =		5117596.		V.		
111		211.7	201.0	311/370.	0.U4U0			0.
112	0.	U.	1408.3	32810.	0.	0.	0.	0.
113	· · ·	0.		3928049.	0.		0.115E 19	٥.
114	477.5	108.5	77.7	14266.	0.0161		٥.	477.5
115	477.5	108.5	77.7				0.	477.5
116	477.5	108.5	77.7	25866.	0.0161	0.623	٥.	477.5
117	477.5	108.5	77.7	14945.		0.660	0.	477.5
118	477.5	108.5	77.7	0.	0.0161	٥.	0.	0.
119	477.5	108.5	77.7	17244.		0.660	0.	477.5
120	0.	0.	0.	4787.	0.	0.	0.	٥.
122	0.	0.	Õ.	3086951.	o.	0.	0.	0.
123	3.2	113.5					3.200	
125	349.7	754.0		8232.				3 <b>45.</b> 5
130	0.		0.			0.	0.	0.
	79.9			70599.				79.9
132	80.1			75875.	7.9276			80.1
133	0.	0.					0.	0.
201	0.1	0.	1525.6	0.	0.	236.662	0.	0.

VALVE POINT 3RD VL 05/16/87 TEST POINT 10 INTERMOUNTAIN PWR PROJECT UNIT #2 820000. KW TC6F-30 IN LSB TURBINE NO 270T151 2400. PSIG 1000./ 1000. F 2.300 IN HG ABS

CALCULATED USING ASME STEAM TABLES

#### COMBINED TURBINE-CYCLE PERFORMANCE

TEST CONDITIONS \* RATED CONDITIONS

TOTAL LOAD 789272. 788480. HEAT RATE 7784.0 7791.8 THROTTLE FLOW 5527099. 5612929.

#### TURBINE THERMAL PERFORMANCE

	HIGH PRE	ESS TB	RE				
*			IP TB		LP TB		
	THROTTLE	COLD RHT	INLET	EXH		EXH	
PRESS	2382.40	512.70	473.00	107.50		2.956	
TEMP	1001.70	606.50	1007.01	624.60	)	114.54	
ENTH	1462.61	1302.07	1524.88	1341.37	7	1030.66	
ENTR	1.5351		1.7462	1.7618	3		
Section Sectio	86.	. 188	91.698		93.	468	
ABSCISSA	PHPX/PT=0.2	152	P1STSTG/PT=0.713	ı	VAN=	588.8	

#### THRU FLOW PERFORMANCE OF CONDENSING SECTION

SHAFT NO 1

	TOTAL TB ENERGY	BALANCE LP TB	LP TB ENERGY RHT TB	BALANCE LP TB
AE	528.77	336.32		
H ELEP	1030.66		1030.66	
H UEEP	1038.10		1038.10	
EFF ELEP	93.47	92.39	93.47	92.39
EFF UEEP	92.06	90.17	92.06	90.17
VAN	588.80		588.80	

<sup>\*</sup> LOAD AND HEAT RATE AT RATED POWER FACTOR AND H2 PRESS. FLOW AT RATED THROTTLE PRESS. OF 2412.2 PSIA AND TEMP. OF 1000 F.

A10-1

	TOTAL TB ENERGY	BALANCE	LP TB ENERGY	BALANCE
	RHT TB	LP TB	RHT TB	LP TB
H ELEP	1032.68		1032.68	
H UEEP	1040.16		1040.16	
EFF ELEP	93.08	91.78	93.08	91.78
EFF UEEP	91.67	87.56	91.67	89.56
VAN	590.06		590.06	

#### STAGE FLOW FUNCTION

STE		ONE VEL HD	PCT DELTA	FLANG P PRESS		Q/AP H FLG	QFS	Q/AP H SHL
1	1698.80	0.	0.	0.	86.6	0.	5477243.	1007.5
4	973.63	3.438	1.11	962.80	157.4	843.3	4964326.	838.5
RH 1	473.00	0.	0.	Q.	350.2	0.	4522392.	798.5
8	463.54	0.	0.	0.	350.2	0.	4533585.	816.7
11	210.70	0.720	1.09	208.40	711.2	791.2	4326377.	782.0
15	107.50	0.	0.	0.	807.6	0.	3884894.	1128.6
15	59.35	0.245	1.20	58.64	1414.8	1089.7	3762662.	1066.9
16	36.17	0.164	1.31	35.70	2021.4	1106.4	3514296.	1086.2
18	10.57	0.052	1.42	10.42	6018.0	1091.1	3386760.	1052.5
19	4.50	0.023	1.46	4.44	12096.0	1133.7	3267123.	1125.3

1		_		D	[,]	Δ.	T	garan.	R	~	v	F .		<b>E</b>
- 1	_		-	13	MAI I	1-4	£	-	rn.	f	7		L	

			,				
			•			ATER	8
			468.90				
					495782.4		
3	DRAIN	953.50	475.10	458.86	495782.4	DC =	6.2
					HE	ATER	7
7	FW TN	2658-10	387.10	364.43			,
		·			470775.2		-1.7
					966557.6		
3	ENTRY	953.50	475.10	458.86	495782.4		
						ATER	6
					5487507.4		
					207207.6		
					1173765.2	DC =	6.9
6	ENTRY	501.00	394.70	369.68	966557.6		
					P	UMP	
11	FW IN	0.	0.	O.	5486207.6		
					108611.9		
		0.			63704.0		
32			0.	0.	0.		
24	EXTR	1500.00	200.00	171.47	0.		
35	FW OUT	2742.60	337.40	312.94	5531115.4		
				470 FFF 470 4 4		ATER	5
					4063570.8		
					248885.5		
					6437598.4		-0.3
109	ENTRY	O.	0.	267.62	2125156.0		
					HE	ATER	4
17	FW IN	161.80	258.80	227.79	4063571.6	CLOSED	
15	EXTR	57.56	520.40	1293.41	122231.4	TD =	-O.i
16	DRAIN	57.56	263.00	231.85	122231.4	DC =	4.2
					g gjene	No. and proceedings.	stage
~~	ret.t Thi	1/1 00	101 /0	150 00		ATER	3
	FW IN	161.80	191.60	159.99	4063571.6	CLOSED	A 7
	EXTR	34.53	419.30	1246.53	248366.5	TD =	-0.3
	DRAIN	34.53	200.30	168.44	370597.9 122231.4	DC =	8.7
10	ENTRY	57.56	263.00	231.85	122231.4		
					HE	ATER	2
23	FW IN	161.80	155.80	124.14	4063571.6	CLOSED	
21	EXTR	10.00	237.30	1164.21	127535.5	TD =	1.6
22	DRAIN	10.00	162.90	130.B7	498133.5	DC =	7.1
19	ENTRY	34.53	200.30	168.44	370597.9		

T	_		PRESS	TEMP	ENTH	FLOW	
70	TDV TDV		4.47 1.73	0. 655.80 480.00 MEAS TOTA	1362.82 1279.10	3136.5 3136.5 0.	TM SEAL REG CALCULATED TO HEATER TO CONDENSER
25 123 22	FW IN EXTR DRAIN ENTRY ENTRY		4.32 4.32	126.50	1093.23 94.46 130.87	4063571.6	TD = 0.4 DC = 5.7
87	FW IN LEAKA FW OL	GE		o. o.	o. o.	Pt 4172183.4 0. 4172183.4	JMP
						F	W TO BOILER
1	FW IN	į	2658.10	540.70	535.26	5487507.4	S+L = -4016.
	•		T	URBIN	EEXPA	NSION	
71 36	EXIT THROTT	ĽĒ	0. 2382.40	0. 1001.70	1462.61 1462.61	٥.	AIN STEAM LINE
						Vf	ALVE STEM LKG
37	LO NO	1	473.20	890.85	1462.61	SQRT 2643.9	P/V = 85.663 C = 55.622
38	LO NO	2	0.	0.	0.		P/V = 16.934 C = 125.247
			1698.80	911.18	1428.41 1428.41	5477243.4 45090.9	(P TO STG 1
						PAG	CKING NO 2
42		1	112.00	682.00	1369.92		P/V =.115E 19 C = 0.000
43	LO NO	2	16.82	675.50	1371.73	SQRT 3749.2	P/V = 4.322 C = 1016.109
100	LO NO	Ž	0.	0.	٥.		P/V = 0.647 C = 1973.597

TL	PRESS	TEMP	ENTH	FLOW
41 SHELL 79 EXTR		0. 773.80		EXP TO STG 4 4964325.7 495782.4
				PACKING NO 1
46 LO NO 1	110.65	593.20	1325.46	SQRT P/V = 21.239 3985.7 C = 362.561
47 LO NO 2	16.74	574.10	1322.64	SQRT P/V = 4.457 3072.0 C = 833.450
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.676 642.7 C = 1973.597
49 EXH 80 EXTR 50 TO RHT	512.70	606.50 606.50 606.50	1302.07	EXPAND TO EXHAUST 4990523.2 470775.2 4519748.0
BEFORE LO 37 ENTRY	0.08	٥.	1525.18	REHEATER 1
84 AFTER LO	473.00	1007.50	1525.15	4522391.9 PCTDP = 7.743
51 ENTRY 125 ENTRY	463.54 473.85	1006.50 807.40		
52 SHELL 53 EXTR	210.70 208.40	0. 808.20	1420.51 1429.36	EXP TO STG 11 4326377.3 207207.6
				PACKING NO 3
57 LO NO 1	16.74	638.60	1353.78	SQRT P/V = 4.262 1732.9 C = 1153.252
58 LO NO 2	16.73	450.30	1359.46	SQRT P/V = 0.655 1897.0 C = 4857.146
100 LO NO 3	0.	0.	0.	SQRT P/V = 0.651 642.7 C = 1973.597
100 LB ND 4	0,	0.	0.	SQRT P/V = 0. 642.7 C = 1973.597

TL	PRESS	TEMP	ENTH	FLOW EXPAND TO EXHAUST
56 EXH 55 EXTR				3884893.9 436568.0
59 ENTRY	107.50	624.60	1341.37	EXPAND TO BOWL 3884893.9
61 SHELL 60 EXTR			1284.30 1299.25	EXF TO STG 15 3762662.5 122231.4
63 SHELL 62 EXTR				EXP TO STG 16 3514296.0 248366.5
65 SHELL 64 EXTR	10.57 10.42	0. 241.60	1146.86 1166.11	EXP TO STG 18 3386760.5 127535.5
107 SHELL 106 EXTR	4.50 4.44	o. o.		EXP TO STG 19 3267122.9 119637.6
TL	PRESS	TEMP	ENTH	FLOW
108 TB EXH 76 ENTRY 122 DRAIN	1.45 O. O.	114.54 O. O.	1038.0987 0. 0.	CONDENSER SHAFT 1 3267122.9 LEVL = -4030.2 901030.3 4172183.4 GENERATOR 1 SHAFT 1
MEASURED LOA SHAFT 1 KW			PF = 0.99	

#### PERFORMANCE

#### TRUNKLINE OUTPUT

TL	P	T	Н	Q	SV	SP	PV	TR
	2658.1	540.7	535.3	5487507.	0.0210	0.	0.	-4016.3
2	953.5	771.8	1374.8	495782.	0.7020	538.835	-1.865	233.0
	953.5		458.9	495782.	0.0198	0.	6.200	0.
4	2658.1	468.9	452.5	5487507.	0.	0.	0.	0.
5	501.0	605.4	1302.4	470775.	1.1641	467.215	-1.685	138.2
6	501.0	394.7	369.7	966558.	0.0185	0.	7.600	0.
7	2658.1	387.1	364.4	5487507.	0.	0.	0.	0.
8	207.0	806.5	1428.5	207208.	3.5841	384.698	0. -2.402	421.8
9	207.0	344.3	315.9	1173765.	0.0179	0.	6.900	0.
10	2742.6	337.4	312.9	5487507.	0.0176	0.	0.	0.
11	0.	0.	٥.	5486208.	0.	0.	0.	0.
12	107.1	624.3	1341.2	248885.	5.9385	332.821	0. -257.200	291.5
13	116.3	290.1	259.6	4063571.	0.0174	0.	0.	0.
14	161.8	290.1	259.7	4063572.	0.0174	1.014	0. 0.	161.8
15	57.6	520.4	1293.4	122231.	10.0231	290.011	-0.089	230.4
16	57.4	263.0	231.9	122231.	0-0171	0.	4.200	0.
17	161.8	258.8	227.8	4063572	0.	o.	0.	o.
18	34.5	419 3	1244.5	248347	14.9977	258.490	-0.310	160. B
							8.700	
							0.	
21	101.0	777.C	1164.7	127574	41 1588	103 200	1.600	AA 1
							7.100	
							0.	
24	1500.0	100.0	171 5	70000/£.	0.0166	0.	0.	0.
	1000.0	200.0	1/1.5	110470	0.0100	154 155	0.355	-156.2
- L	704 5	170 8	1073.2	117000.	O 0147	770.177	0.333	0.
20	206.5	120.8	07.3	4000072.	0.0162	0.	0.	0.
27	0.	0.	٥.	41/2100.	٥.	0.	0.	٥.
	0.	0.	0.	17016.	0.	0.	0.	0.
27	.0.	υ. ^	٥.	44100.	0.	0.	0.	٥.
30	0.	V.,	740 ^	03/V4.	0.0477/	1 001	o. o.	07/0 4
)i	2/47.1	33 <b>6.</b> 3	312.0	43606.	0.01/6	1.001	. 0.	2/47.1
- 12 A	O.	٥.	0.	41/2100.	0.	O	0.	0.
34 7=	0.	U.	710 O	-4V16.	0.	0.	0. 0. 85.663 16.934	0.
30 7/	2742.0	33/.4	312.7	2201112.	0.01/6	V.	O# 447	0.
30	2362.4	1001.7	1402.0	3327077.	0.32470	-100E 0/	00.000	0.
ن حد	4/3.2	870.7	1402.6	2044.	1.6502	0.780	10.704	55.6
					0.			
	2382.4				0.3247		85.663	0.
40	1698.8				0.4311			
	973.6	O.	13/5.6	4964326.	0.6882	541.884		838.5
42				12/43.	5.9948			
43		675.5			40.1225	0.	0.647	
45	0.	0.		33898.	0.	0.	٥.	0.
46				3986.	5.5700	0.703		
47				3072.			0.676	833.5
48	0.	٥.		4998224.	0,.	0.	٥.	0.
49					1.1366			0.
50	512.7			4519748.		0.	0.	٥.
51	463.5	1006.5	1524.9	4533585.	1.8455	0.	15.851	0.

TL	F	Т	Н	Q	SV	SP	PV	TR
							7.779	
53							7.646	
			1427.4	207208.	J.JO47	303.200	/ . 0 40	0.
54		624.6	1341.4	4321462.	5.9178	0.	4.262	O.
55	110.3	627.7	1342.7	436568.	5.7827	334.988	0.	0.
56	107.5	624.6	1341.4	3884894.	5.9178	333.095	0.	0.
57							0.655	
58.							0.651	
59	107.5	624.6					4.262	
60	58.6	532.5	1299.3	122231.	9.9634	291.217	2.426	٥.
61	59.4	Ö.	1284.3	3762662.	9.5508	292.154	2.493	1066.9
							1.561	
63	36.2	0.	1239.6				1.601	
64	10.4	241.6	1166.1	127536.	39.7310	195.160	0.512	٥.
45	10.6	0.	1146.9	3386760.	36.9731	196.276	0.535	1052.5
66							0.	
67	107 1	77E 4	1100 0	7.4001	/ 1717	Ŏ.	^.	Ŏ.
	10/.1	333.0	1170.0	0.	4-1/10	0.	o.	O.
68							0.	
69	4.5	<b>655.8</b>	1362.8	919.	148.6988	0.	0.	0.
70	4.5	<b>655.8</b>	1362.8	3137.	148.6988	0.	0.	0.
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75	o.	0.	0.	5579.	0.	0.	0.	0.
76	0.	O.	0.	901030	0.	0.	0.	٥.
79	040 0	777 0	1775 4	//05707	0 4041	540 001	37.192	0
	702.0	//www	47/0:0	7/4/44	0:0/01	070:VOI	~/**/	
80	217.	606.5	1302.1	4/0//5.	U	O.	٥.	U.
							٥.	
82	o.	0.	0.	4519748.	0.	0.	0.	٥.
83							٥.	
84							16.172	
00	v.	O.*	٧.	IVOGIZ.	· 0.	٧.	٥.	v.
							0.	
70	137.1	333.1	304.1	٥.	0.0178	0.	0.	٥.
91	131.6	239.4	208.1	951391.	0.0169	0.647	0.	131.6
95	1.5	114.5	1030.7	3247123.	214, 4359	1038-099	2.956	588.8
99					0.			
100	0.			643.	0.	0.		1973.6
104								
106	4.4					1.028	0.	2658.1
107		0.					0. 0.237	2658.1
			1093.2	119638.	79.2923	157.242	0.237	2658.1
1 ( )	4.5	0.	1093.2 1093.6	119638. 3267123.	79.2923 78.1822	157.242 0.	0.237 0.240	2658.1 0. 1125.3
	4.5 1.5	o. 114.5	1093.2 1093.6 1038.1	119638. 3267123. 3267123.	79.2923 78.1822 234.8375	157.242 0. 1038.099	0.237 0.240 2.956	2658.1 0. 1125.3 -4030.2
109	4.5 1.5 0.	0. 114.5 0.	1093.2 1093.6 1038.1 267.6	119638. 3267123. 3267123. 2125156.	79.2923 78.1822 234.8375 0.	157.242 0. 1038.099 0.	0.237 0.240 2.956 0.	2658.1 0. 1125.3 -4030.2 0.
109 111	4.5 1.5 0. 107.1	0. 114.5 0. 333.1	1093.2 1093.6 1038.1 267.6 304.0	119638. 3267123. 3267123. 2125156. 6437598.	79.2923 78.1822 234.8375 0. 4.1542	157.242 0. 1038.099 0. 0.	0.237 0.240 2.956 0. -0.279	2658.1 0. 1125.3 -4030.2 0. 0.
109 111	4.5 1.5 0. 107.1	0. 114.5 0. 333.1	1093.2 1093.6 1038.1 267.6 304.0	119638. 3267123. 3267123. 2125156. 6437598.	79.2923 78.1822 234.8375 0. 4.1542	157.242 0. 1038.099 0. 0.	0.237 0.240 2.956 0. -0.279	2658.1 0. 1125.3 -4030.2 0. 0.
109 111 112	4.5 1.5 0. 107.1 0.	0. 114.5 0. 333.1 0.	1093.2 1093.6 1038.1 267.6 304.0 1428.4	119638. 3267123. 3267123. 2125156. 6437598. 45091.	79.2923 78.1822 234.8375 0. 4.1542 0.	157.242 0. 1038.099 0. 0.	0.237 0.240 2.956 0. -0.279 0.	2658.1 0. 1125.3 -4030.2 0. 0.
109 111 112 113	4.5 1.5 0. 107.1 0. 0.	0. 114.5 0. 333.1 0.	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0.	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.	157.242 0. 1038.099 0. 0. 0.	0.237 0.240 2.956 0. -0.279 0. 0.115E 19	2658.1 0. 1125.3 -4030.2 0. 0.
109 111 112 113 114	4.5 1.5 0. 107.1 0. 0 436.9	0. 114.5 0. 333.1 0. 0.	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740.	79.2923 78.1822 234.8375 0. 4.1542 0. 0. 0.0162	157.242 0. 1038.099 0. 0. 0. 0.	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9
109 111 112 113 114 115	4.5 1.5 0. 107.1 0. 0. 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0. 0.624	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9
109 111 112 113 114 115 116	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0. 0.624 0.624 0.623	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9
109 111 112 113 114 115	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0. 0.624 0.624 0.623	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9
109 111 112 113 114 115 116 117	4.5 0. 107.1 0. 0. 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384.	79.2923 78.1822 234.8375 0. 4.1542 0. 0. 0.0162 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0. 0.624 0.624 0.623 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9
109 111 112 113 114 115 116 117	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0. 0.624 0.624 0.623 0.660 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9
109 111 112 113 114 115 116 117 118	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0. 0.624 0.623 0.660 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9
109 111 112 113 114 115 116 117 118 119	4.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 0.	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0.624 0.624 0.623 0.660 0.660 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 0.
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109 111 112 113 114 115 116 117 118 119 120 122 123	4.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 119.7 0. 0. 126.5	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8 88.8 98.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765. 4172183. 620908.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0.624 0.624 0.623 0.660 0.660 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 0. 0.
109 111 112 113 114 115 116 117 118 119 120	4.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 119.7 0. 0. 126.5	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8 88.8 98.8	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765. 4172183.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162	157.242 0. 1038.099 0. 0. 0. 0.624 0.624 0.623 0.660 0.660 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9
109 111 112 113 114 115 116 117 118 119 120 123 125	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9 0. 0. 0. 4.3 473.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 119.7 119.7 0. 0. 126.5	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8 98.8 94.5 1418.1	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765. 4172183. 620908. 11193.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 1.5335	157.242 0. 1038.099 0. 0. 0. 0.624 0.624 0.623 0.660 0.660 0.660 0.660	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0. 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 6. 0. 0. 0.
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109 111 112 113 114 115 116 117 118 119 122 123 125 130 131	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 119.7 0. 0. 126.5 807.4 0. 624.0	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8 0. 0. 94.5 1418.1 0. 1341.0	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765. 4172183. 620908. 11193. 204412. 99289.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.5335 0. 5.8700	157.242 0. 1038.099 0. 0. 0. 0. 0.624 0.623 0.660 0.660 0.660 0.660 0.628 0.	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0. 0. 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9
109 111 112 113 114 115 116 117 118 122 123 123 131 132	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 4	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 0. 0. 126.5 807.4 0. 624.0 623.8	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8 0. 74.5 1418.1 0. 1341.0 1340.9	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765. 4172183. 620908. 11193. 204412. 99289. 105122.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.5.8335 0. 5.8700 5.8633	157.242 0. 1038.099 0. 0. 0. 0.624 0.623 0.660 0.660 0.660 0.660 0.628 0. 1.018 1.019	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0. 0. 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 108.3 108.4
109 111 112 113 114 115 116 117 118 122 123 123 131 132	4.5 1.5 0. 107.1 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 4	0. 114.5 0. 333.1 0. 0. 119.7 119.7 119.7 119.7 119.7 0. 0. 126.5 807.4 0. 624.0	1093.2 1093.6 1038.1 267.6 304.0 1428.4 0. 88.8 88.8 88.8 88.8 88.8 0. 74.5 1418.1 0. 1341.0 1340.9	119638. 3267123. 3267123. 2125156. 6437598. 45091. 5460108. 14740. 13690. 27343. 13384. 19274. 20182. 4765. 4172183. 620908. 11193. 204412. 99289. 105122.	79.2923 78.1822 234.8375 0. 4.1542 0. 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.0162 0.5335 0. 5.8700 5.8633 0.	157.242 0. 1038.099 0. 0. 0. 0.624 0.623 0.660 0.660 0.660 0.660 0.1018 1.018 1.019 0.	0.237 0.240 2.956 0. -0.279 0. 0.115E 19 0. 0. 0. 0. 0. 0. 0.	2658.1 0. 1125.3 -4030.2 0. 0. 0. 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9 436.9

1013-8 (7-70)

# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

#### APPENDIX B

#### **Correction Curves**

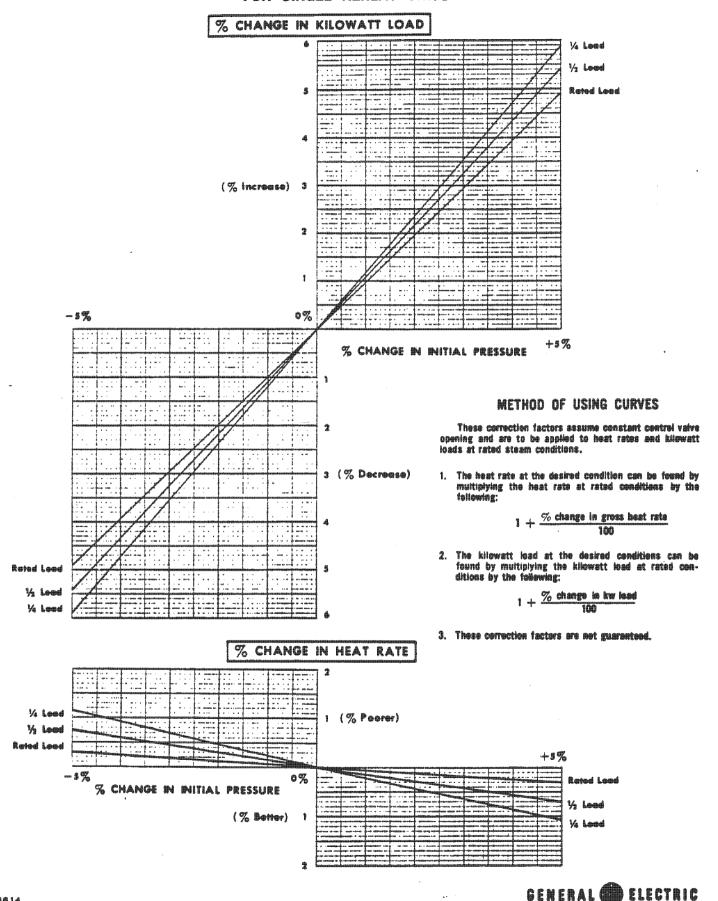
Dwg. No.	Nomenclature	Page
GEZ 3614	Throttle Pressure Correction	B1
GEZ 3615	Throttle Temperature Correction	B2
GEZ 3617	Reheat Temperature Correction	<b>B3</b>
481 HP 475	Exhaust Pressure Correction	B4

Page No. B1

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### INITIAL PRESSURE CORRECTION FACTORS

FOR SINGLE REHEAT UNITS



GEZ-3614

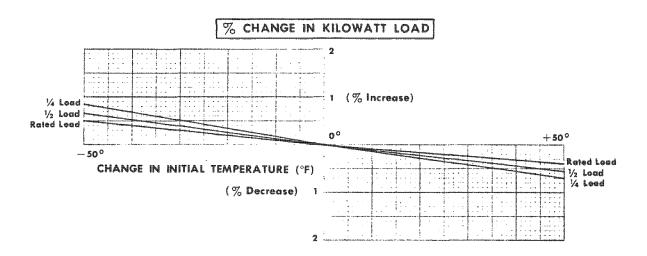
4-81 (2M)

IP14\_005181

FIG. BI

### INITIAL TEMPERATURE CORRECTION FACTORS

#### FOR SINGLE REHEAT - SUBCRITICAL PRESSURE UNITS



#### METHOD OF USING CURVES

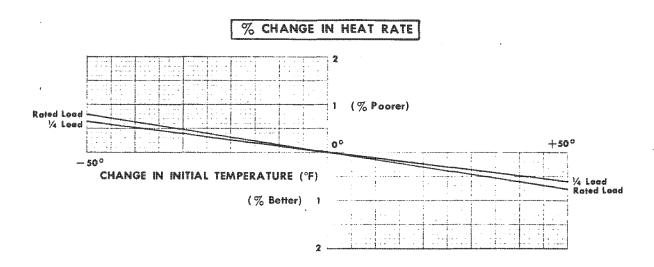
These correction factors assume constant control valve opening and are to be applied to heat rates and kilowatt loads at rated steam conditions.

 The heat rate at the desired condition can be found by multiplying the heat rate at rated conditions by the following:

$$1 + \frac{\% \text{ change in gross heat rate}}{100}$$

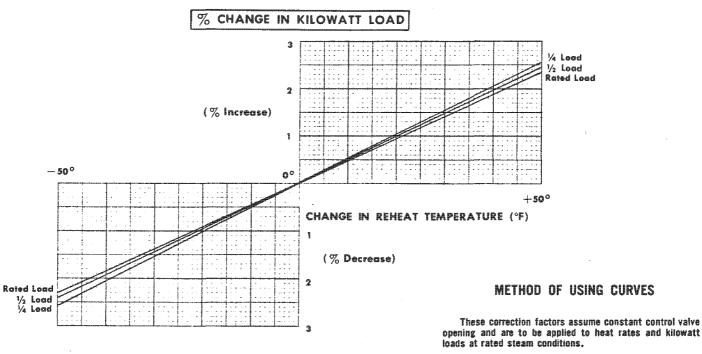
The kilowatt load at the desired conditions can be found by multiplying the kilowatt load at rated conditions by the following:

3. These correction factors are not guaranteed.



GENERAL BELECTRIC

# REHEAT TEMPERATURE CORRECTION FACTORS FOR SINGLE REHEAT UNITS



loads at rated steam conditions.

1. The heat rate at the desired condition can be found by

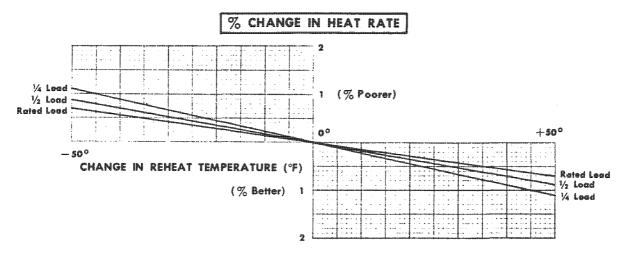
 The heat rate at the desired condition can be found by multiplying the heat rate at rated conditions by the following:

$$1 + \frac{\% \text{ change in gross heat rate}}{100}$$

The kilowatt load at the desired conditions can be found by multiplying the kilowatt load at rated conditions by the following:

$$1+\frac{\% \text{ change in kw load}}{100}$$

3. These correction factors are not guaranteed.

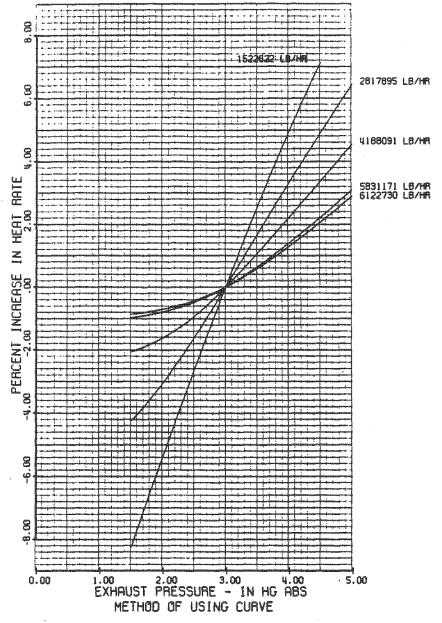


GEZ-3617 2-71 (2M)

GENERAL (2) ELECTRIC

EL BR

820000 KW AT 1.66/ 2.24/ 2.99 IN HG ABS 1.00 PCT MU TC6F-30.0 IN LSB 3600 RPM 2400 PSIA 1000/1000 T



VALUES NEAR CURVES ARE FLOWS AT 2400 PSIA 1000 T
THESE CORRECTION FACTORS ASSUME CONSTANT CONTROL VALVE OPENING
APPLY CORRECTIONS TO HEAT RATE AND KW LORDS
AT 2.99/ 2.24/ 1.66 IN HG ABS AND 0.0 PCT MU.

THE PERCENT CHANGE IN KW LOAD FOR VARIOUS EXHAUST PRESSURES IS EQUAL TO (MINUS PCT INCREASE IN HEAT RATE) 100/(100 + PCT INCREASE IN HEAT RATE)

THESE CORRECTION FACTORS ARE NOT GUARANTEED

PRESSURES ALONG ABSCISSA ARE PRESSURES IN HOOD c

PRESSURE (IN	HG	ABS)	FOR	HOOD	C	HOOD	В	HOOD	Α
				1.50		1.09		. 78	
				2.00		1.47		1.07	
				2.50		1.85		1.36	
				3.00		2.24		1.66	
				3.50		2.63		1.96	
				4.00		3.03	•	2.27	
				4.50		3.42		2.58	
				5 00		3 82		2 80	

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.013-8 (7-70) PHOTO OFFSET-TOS

## GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

#### APPENDIX C

#### Correction To Heat Rate and Load

,	Test Heat Rate	and Load	Corrected	to Rated Co	onditions	С
	Contract Cycle	Heat Rat	e and Load	Corrected t	to Rated Conditions	C

#### Notes:

Page C2 shows the measured values of heat rate and load corrected for group 2 corrections. These corrections include power factor, H<sub>2</sub> pressure, throttle pressure, throttle temperature, reheat temperature and exhaust pressure. No correction for off-design cycle conditions are included in the corrected test heat rate and load.

Page C3 shows the contract cycle heat rates and loads which represent the measured heat rate corrected to the specified cycle on the guarantee heat balance (i.e., group 1 corrections). The corrected contract cycle heat rates and loads have also been corrected for group 2 corrections and these are the final values of heat rate and load to compare to the guarantee values.

Page No. C1
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### TEST HEAT RATE AND LOAD

TEST POINT	2	3	<b>4</b>	5	6	7	8		10
BUMHARY OF TEST CONDI	T10NS:								
MEASID LOAD	855960	592031	859850	785980	860755	775096	898356	599736	789272
THROTTLE FLOW	6183909	4056100	6220163	5570279	6224013	5477861	6496919	3978528	5527099
THROTTLE PRESS.	2384.1	2399.8	2394	2393.8	2394.2	2388.9	2477.14	2393.3	2382.4
THROTTLE TEMP.	1004.9	1007.2	1000.8	1001.5	996.5	1006.6		1008.8	1001.7
IOT REHEAT TEMP.	1000.2	1001.3	1009.2	1006.2			996.3	1001.6	1607.5
EXHAUSI PRESS.	3.739	3.074		3.403			3.195	2.063	2.956
ONER FACIOR	0.987	0.991	0.989			-	1	0.996	0.998
HZ PRESSURE	64	58	64	64	64	62	63	53	<b>6</b> 3
rest Heat Rate	7863.6	7986.8	7883.3	7866.2	7855	7872.3	7772.3	7762.8	7791.8
EST LOAD	855119	591526	858986	785201	857887	774305	898356	599283	788480
EAT RAKE CORRECTIONS	(dividing	factors)	5 0						
ř. T	1.0007	1.0006	1.0005	1.0006	1.0005	1.0008	0.9983	1.0009	1.0010
T	0.7993	0.9990	0.9979	0.9998	1.0006	0.9990	1.0019	0.9988	0.9997
1 HRH	1.0000	0.9998	0,9987	0.9991	0.9996	0.9994	1.0005	0.9997	0.9989
PEXH	1.0247	1.0219	1.0258	1.0217	1.0216	1.0245	1,0127	0.9935	1.0118
OMBINED CORR	1.0247	1.0212	1.0248	1.0211	1.0224	1.0237	1.0134	0.9929	1.0114
DAD CORRECTIONS (div	iding fact	ors):							
PT	0,9885	0.9946	0.9926	0.9923	0.9927	0.9903	1.0264	0.9917	0.9876
11	0.9996	0.9993	0.9999	0.9999	1.0004	0.9994	1.0012	0.9991	0.7979
THRH	1.0001	1.0006	1.0043	1.0029	1.0015	1.0020	0.9983	1.0008	1.0035
PEXH	0.9759	0.9786	0.9749	0.9788	0.9788	0.9760	0.9875	1.0066	0.9894
OMBINED CORR	0.9644	0.9732	0.9717	0.9740	0.9735	0.9679	1.0130	0.9981	0.9794
							· 查世里或你在你看怎		
ORR TEST HEAT RATE	7674.2	7820.7	7692.2	7703.3	7683.2	7689.9	7669.5	7918.4	7704.2
ORR TEST LOAD	886683	607794	883979	806176	8B3276	799958	886810	600425	805040

### CONTRACT CYCLE HEAT RATE AND LOAD

TEST POINT	Ž	3	4	5 _	6	7	8	9	10
SUMMARY OF YEST COND	ITIONS:								
MEAS'D LOAD	<b>B</b> 55960	.592031	859850	705000	B60755	775096	555781	599736	789272
THROTTLE FLOW	6183909		6220163		6224013			3978528	
THROTTLE PRESS.	2384.1	2399.8					2477.14		
THROTTLE TEMP.	1004.9	1007.2			996.5				
HOT REHEAT TEMP.	1000.2		1009.2				996.3		
EXHAUST PRESS.	3.739	3.074		3.403				2.063	
FOWER FACTOR	0.987	0.991	0.989	1	0.989	1		0.996	0.998
H2 PRESSURE	64	58	64	64	64	62	63	63	63
CONTRACT CYCLE									
	7958.85	8084.63	7984.94	7977.65	7951.25	7996.85		7872.34	7897.17
LOAD	843804.9						ôre ean dan fan (®7 100 (\$7 40¢ €n)		
HEAT RATE CORRECTION	5 (dividing	factors)	);						
PI	1.0007	1.0006	1,0005	1.0006	1.0005	1.0008	0.9983	1.0009	1.0010
TT	0.9993		0.9999	0.9998	1.0004	0.9990	1.0019	0.9988	0.9997
THRH	1.0000								
PEXH	1.0247			1.0217			1.0127		1.0118
COMBINED CORR	1.0247	1.0212	1.0248	1.0211	1.0224	1.0237	1.0134	0.9929	1.0114
LOAD CORRECTIONS (di	viding fact	ors):							
PT	0.9885	0.9946	0.9926	0.9923	0.9927	0.9903	1.0264	0.9917	0.9876
11	0,9994								
ïHRH	1.0001	1.0006	1.0043	1.0029	1.0015	1.0020	0.9983	1.0008	1.0035
PEXH	0.9759	0.9786	0.9749	0.9788	0.9788	0.9760	0.9875	1.0066	0.9884
COMBINED CORR	0.9644	0.9732	0.9717	0.9740	0.9735	0.9679	1.0130	0.9981	0.9794
<b>张弘祖等以不知及以此是都然实实实实出的的</b>					32882625				
CORR TEST HEAT RATE	7767.2	7916.5	7791.4	7812.4	7777.4	7811.6	cal try (02 50 to can ten ten ten ten	7928.7	7808.4
CORR TEST LOAD .	874951	602734	872168		871223				794286

013-8 (7-76)

# GENERAL ELECTRIC COMPANY TECHNICAL INFORMATION SERIES

NO. DF87STG05

#### APPENDIX D

#### **Enthalpy Drop Efficiency**

	Pag <u>No</u>
Summary of Data and Results of the IPP #1 Startup Enthalpy Drop Test	Di
Correction Curves for HP Efficiency	D
General Description of Enthalpy Drop Efficiency Test	D

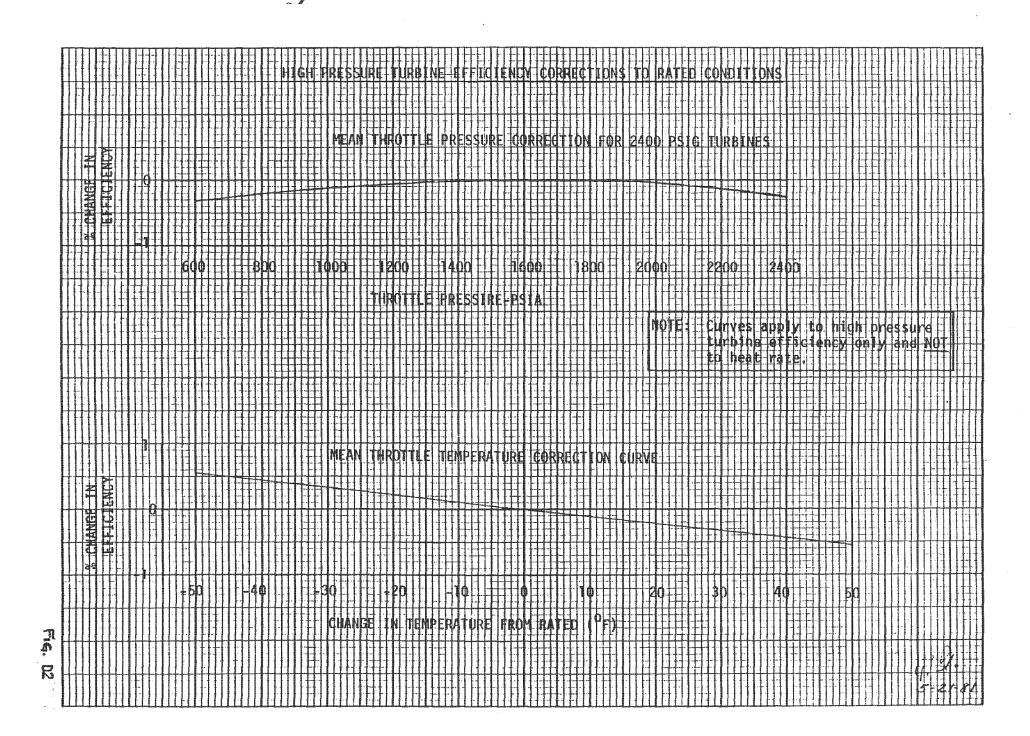
Page No. D1
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## INTERMOUNTAIN POWER PROJECT UNIT # 2 Enthalpy Drop Startup Test Data

TEST PT.		1	2	**************************************
VALVE FT.		2nd	3rd	VWO
THROTTLE F	(psia)	1495.37	1212.0	1216.05
THROTTLE T	(deg F)	1004.29	1003.82	1003.35
CRH P	(psia)	283.70	293.41	324.00
CRH T	(deg F)	609.43	643.84	659.15
VC P	(psia)	1481.18	1197.10	1205.95
1st STG F	(psia)	818.18	895.83	996.95
P1/PT		. 5471	.7390	.8198
HP (effy,)		81.835	87.10	88.71
T (corr.)		+ . 0 2 5	+.033	+.030
F (corr.)		24	16	16
HTR (corr.)		+.80	+.60	+.60
HP (effy) corrd.		82.43	87.573	89.18
<b>Н</b> ЕН Р	(psia)	262.3	269.24	297.38
HRH T	(deg F)	972.78	995.14	776.74
LPB F	(psia)	59.926	59.860	66.269
LPB T	(deg F)	599.44	612.72	614.82
IP (effy.)		91.569	91.74	91.613
HTR (corr.) **		+.40	+.40	+.40
IP (effy) corrd.		91.969	92.14	92.013
HTR (Out Serv.)		6AB,7AB,8AB	6B,7B,8AB	6B,7B,8AB
Barometric	Pres. (Psia)	12.54	12.5	12.48

<sup>\*\*</sup> Data from Unit # 1 showed a change in performance level of 0.40% points with # 6 heater in service.

Fig. DI



P14\_005190

#### ENTHALPY DROP EFFICIENCY TEST

A turbine section efficiency can be measured if superheated steam conditions exist at both the inlet and exhaust of the section and the steam is thoroughly mixed so that the average temperature can be measured. The efficiency is defined as the energy used divided by the isentropic energy that is available. See Figure 1.

It is customary practice to measure the efficiencies of the high pressure turbine and intermediate pressure turbine of fossil fired reheat turbines with this method.

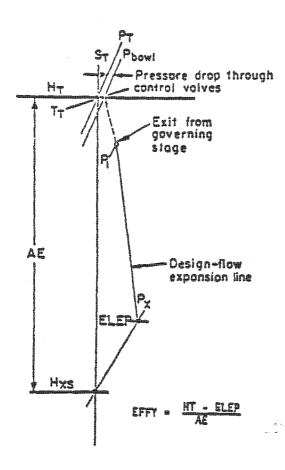


Fig. 1-4. Construction of expansion lines for non-condensing turbinus with garacting stage (HP TB)

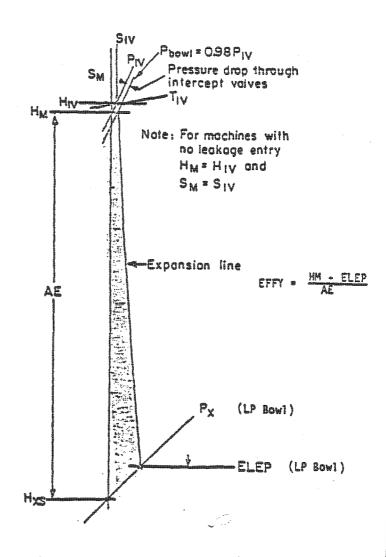


Fig. 1-b. Communication or experience lines for IP turbing

To obtain an acceptable degree of accuracy and precision, the tests must be run by holding steam temperatures, pressures, and flows constant. Fluctuations of steam pressure should not exceed one percent of absolute pressure; temperature fluctuations should not exceed 5 F. Steam flows and load can be held constant by proper operation of the control mechanism. Care must be taken to insure that the turbine is up to operating temperature. After attaining steady conditions for at least half an hour, a test of one-hour duration with temperatures and pressures read at five-minute intervals should give satisfactory results.

The probable error of these section efficiencies is about 0.25 percent. This accuracy is based upon the ability to measure pressure within 0.1 percent at the throttle and reheat points, and 0.1 psi at the intermediate-pressure-section exhaust, and temperatures within 1/2 F. This probable error has been verified by comparing measured flow with calculated flow using enthalpy-drop efficiencies on the high-pressure section of cross-compound units.

Pressures above 35 psia should be measured with piston-type, dead-weight gages using calibrated weights. \* For a lower pressure a transducer may be used.

The design of a pressure tap should conform with the ASME Power Test Codes. Taps should be in a straight run of pipe, or at least not in or immediately adjacent to, a sharp turn, and should consist of a flush hole in the pipe wall. Care should be taken to remove any burrs.

The pressure connections should be located ahead of the turbine emergency stop valve, ahead of the intercept valve, in a cold reheat pipe near the high-pressure-section exhaust connection, and in the low-pressure-section bowl. If the intercept valve is directly connected to a reheat stop valve, then the pressure connection should be immediately ahead of the reheat stop valve. Figure locates these points of pressure measurements.

The pressure connection may be on the top, bottom, or side of a steam pipe provided certain precautions are taken to insure a definite water leg. If the connection is from the top or side of the steam pipe, the pressure-gage piping should be run horizontally and then dropped down. The same rule holds when the pressure gage is to be located above the pressure connection, i.e., there should be a downward loop in the gage line right near the pressure

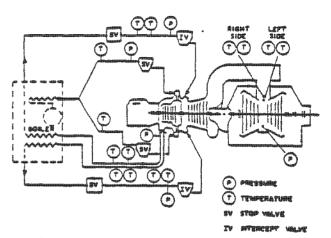


Fig.2 Schematic arrangement of pressure and temperature instrument locations

connection. Pigtails are acceptable. These arrangements are shown in Fig. 3.

The pressure connection in the low-pressuresection bowl is located in the bottom of the bowl and is a 1/2-inch pipe, plugged at the end, and has several 1/4-inch diameter holes drilled through near the end of the pipe, Fig. 4.

For cross-compound turbines the intermediatepressure-section exhaust pressure tap should be in the crossover pipe immediately downstream of the exhaust connection.

Temperatures should be measured with precision resistance thermometers or calibrated thermocouples and read on precision bridges and potentiometers.

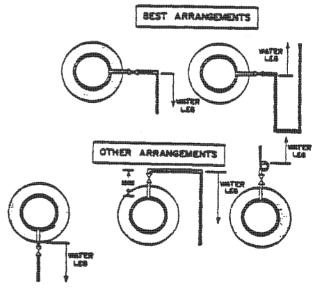


Fig. 3. Pressure-gage connections to steam pipes

+High accuracy transducers may be substituted if calibrated before and after the test.

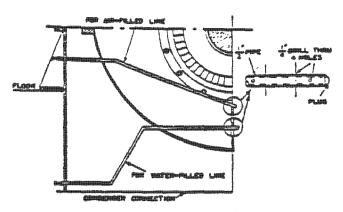


Fig. 4 Section through low-pressure turbine bowl showing pressure top installation

If is recommended to duplicate temperature instrumentation. This will not only improve the accuracy of the data but will also detect a faulty temperature measurement. Placing the two thermowells in the top of a horizontal pipe so they are at about a 45-degree radial angle on each side of the vertical center line is a good scheme. The object is not to have two thermowells in line, Fig. 5.

When there are two separate steam leads from the boiler to the turbine, duplicate instrumentation in each lead is recommended, Fig. 2.

The length of the thermocouple well from the inner wall of pipe extending into the stream deserves attention in order to eliminate the error due to heat conduction up the thermocouple well wall. At the throttle the immersion should be? 2"and almost all standard installations are satisfactory. At the hot reheat point it is recommended that the immersion should be at least four inches if the outside diameter of the well is not greater than 1 1/2 inches. At the cold reheat point the immersion should be six inches. The location of the thermowells in the cold reheat line should be some distance downstream from the turbine and after at least one elbow to provide the proper mixing. The maximum distance from the turbine should not exceed 50 (eet.

The thermocouple wells in the low-pressuresection bowl are made up of four 1/4-inch pipes which are securely fastened in the steam path. These probes should have radiation shields on their ends because the temperatures of all the wall surfaces in the bowl may be somewhat lower than the bowl steam temperature. A typical installation is shown in Fig. 6.

For cross-compound turbines, two thermocouple wells should be in each crossover pipe located near the downstream end of the pipe. The immersion should be at least six inches if the outside diameter of the well is no greater than 1 1/2 inches.

Sample calculations of high-pressure and intermediate-pressure-section efficiencies are given in Table 1.

#### TABLE 1 SECTION EFFICIENCIES

#### High-pressure Section Efficiency

 $P_1 = 1815 psia$ 

 $P_2 = 430 \text{ psia}$ 

 $T_1 = 1000 F$ 

H<sub>1</sub> = 1480.3 Btu/lb

T<sub>2</sub> = 638.8 F H<sub>2</sub> = 1326.8 Btu/lb

Entropy = 1.5739 Btu/lb F

Isentropic

end point = 1298.4 Btu/lb

Efficiency = \frac{1480.3 - 1326.8}{1480.3 - 1298.4} \times 100 = 84.4 percent

#### Intermediate-pressure Section Efficiency

 $P_1 = 402.0 \text{ psia}$ 

 $P_2 = 44.0 \text{ psia}$ 

 $T_1 = 1000 F$   $H_1 = 1522.4$ = 1522.4 Btn/lb

 $T_2 = 470.0 F$ 

Reheat Bowl

\*710,290 x 1522.4 + 21,300 x 1450.8 = 1520.3 Btu/lb 731,590

Flows estimated from design heat balances

Entropy P<sub>1</sub> and H<sub>mix</sub> = 1.7600 Btu/lb F Isentropic end point = 1244.9 Btu/lb

Efficiency =  $\frac{1520.3 - 1270.0}{1520.3 - 1244.9} \times 100 = 90.9$  percent

\*or for tandem compound units with external pipes. In the near future all GE provisions will be in the crossover pipes.

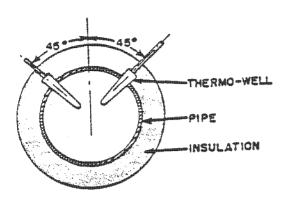


Fig. 5 Typical thermocouple-well arrangement

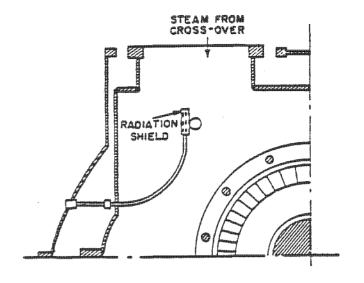


Fig. 6 Section through low-pressure turbine bowl showing thermocouple-well installation